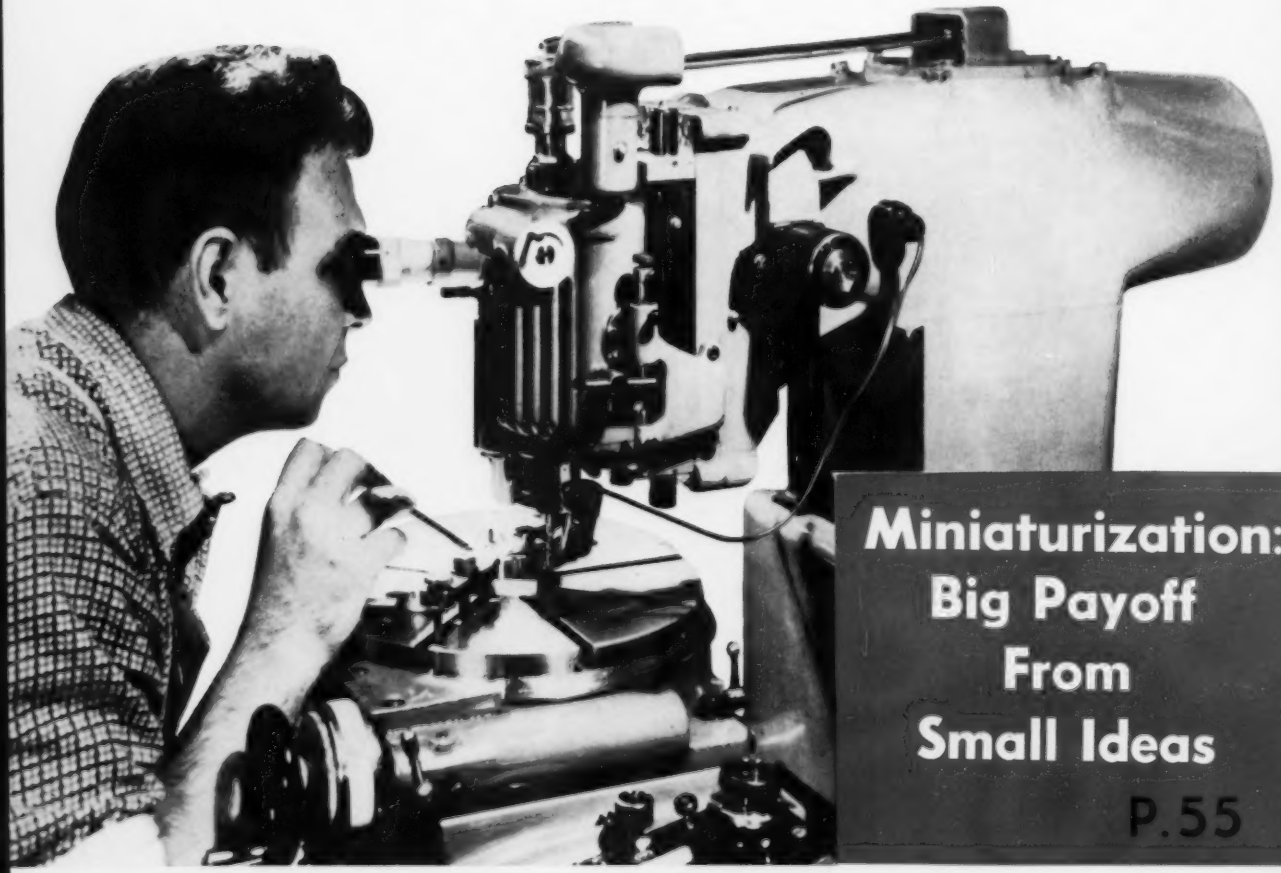
June 14, 1956

The IRON AGE

The National Metalworking Weekly



Miniaturization: Big Payoff From Small Ideas P.55

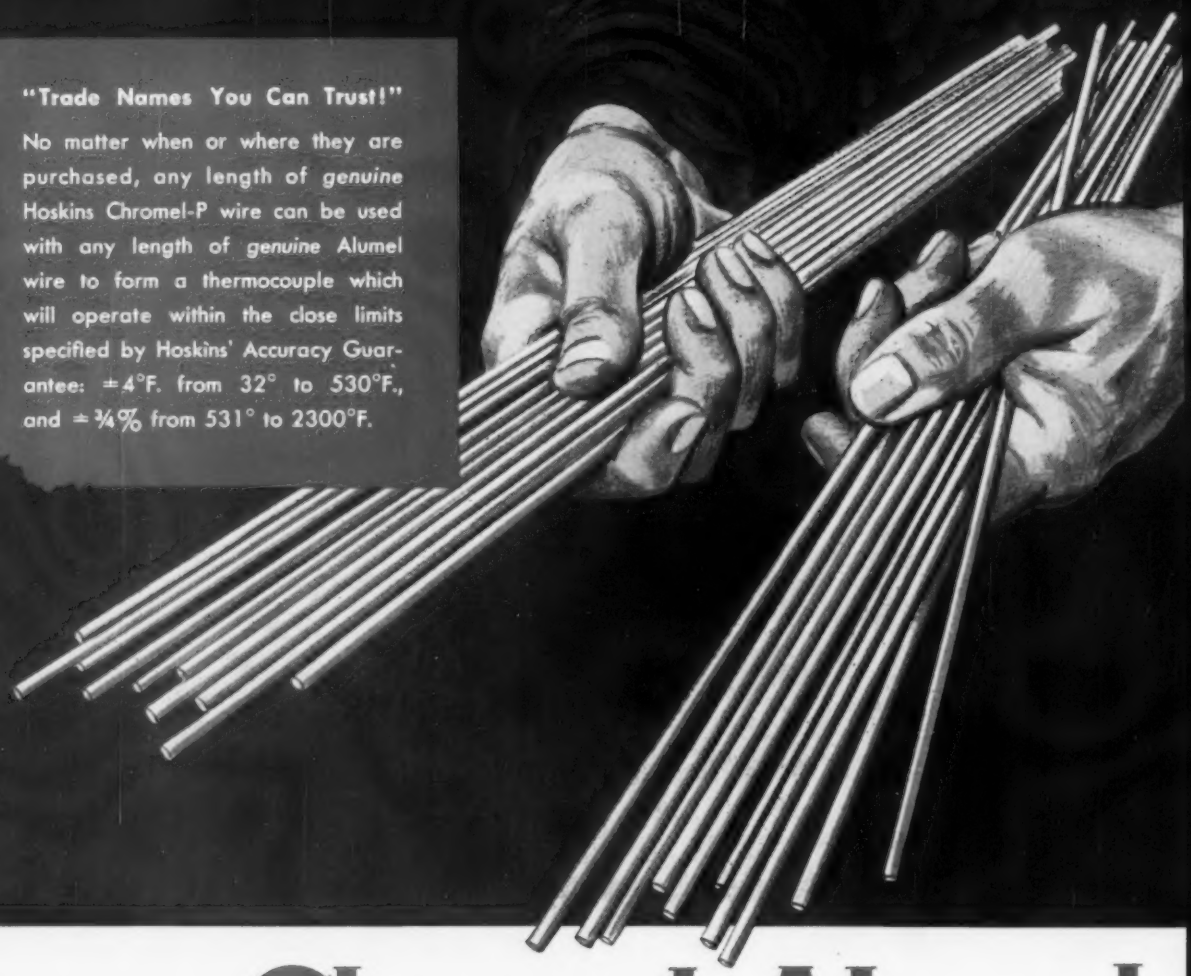
Building Pace Booms Construction Equipment P.60

Tryout Press Puts Squeeze On Downtime P.95

Digest of the Week P–2

"Trade Names You Can Trust!"

No matter when or where they are purchased, any length of *genuine* Hoskins Chromel-P wire can be used with any length of *genuine* Alumel wire to form a thermocouple which will operate within the close limits specified by Hoskins' Accuracy Guarantee: ±4°F. from 32° to 530°F., and ±¾% from 531° to 2300°F.



HOSKINS Chromel-Alumel

THERMOCOUPLE ALLOYS

CONSIDER for a moment the significance of the statement made above and what it means to users of Hoskins Chromel-Alumel thermocouple alloys the world over. For example, take "The Case of the Ageless Alumel" . . .

Not long ago, an industrial concern in Japan "discovered" 265 pounds of 8-gauge wire hidden away in a remote corner of their plant. Its Inspection Tag, still intact, identified it as being Hoskins Alumel that had been purchased over 20 years ago. How it had escaped being used during all those years no one knew. Inasmuch as it was still in good usable condition, however, the company wrote to inquire if it would be practical . . . or indeed even possible to have a similar quantity of 8-gauge Chromel-P wire specially processed so that its millivoltage would match that of the 1933-vintage Alumel. Imagine their surprise when they were advised that all Chromel-P alloy is specially processed by Hoskins to a uniform standard of quality, and that . . . "regardless of when produced or where purchased, any length of *genuine* Chromel-P wire can be joined to any length of *genuine* Alumel to form a thermocouple which will register true temperature-emf values within the close specified limits of Hoskins Accuracy Guarantee."

No wonder, then, that Chromel-Alumel thermocouples are the world's basic standard of accuracy for the measurement of high temperatures. No wonder that the words "Chromel-Alumel" are recognized as . . . "trade names you can trust!"

If you use thermocouples, this new manual is meant for you! It contains complete specifications on Chromel-Alumel alloys, lists temperature-millivolt equivalents, explains standardization procedures, gives much useful application data. And it's yours for the asking without obligation. Send for your free copy today!

Chromel-Alumel thermocouple alloys are produced exclusively by

HOSKINS MANUFACTURING COMPANY

4445 LAWTON AVENUE • DETROIT 8, MICHIGAN

XV

This is the fifteenth of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Boron and Its Effects in Alloy Steels

Boron is a nonmetallic element of which this country has a plentiful supply. In its natural or unprocessed state it occurs only in combination, as in borax, etc. Pure boron is a gray, extremely hard solid with a melting point in excess of 4000 deg F.

This element is used in steel for one purpose only—to increase hardenability; that is, to increase the depth to which the steel will harden when quenched. Its effective use is limited to sections whose size and shape permit of liquid quenching. Only a few thousandths of 1 pct is ordinarily added, and boron steels are evaluated by increased hardenability rather than chemical content. A number of alloys, including several grades of ferroboron, are available for adding boron to steel.

Boron intensifies the hardenability characteristics of other elements present in the steel. It makes possible a considerable degree of alloy conservation when used with steels containing small amounts of alloying elements. However, since it readily oxidizes at high temperatures, some steelmakers prefer a melt with relatively low boron content and relatively high contents of other elements that protect the boron from oxidation.

It should be noted that boron is very effective when used with low-carbon alloy steels; but its effect is reduced as the carbon increases. When the carbon content is above 0.60 pct, the use of boron is not suggested, the exception being the "case" in those steels that are carburized.

Boron steels often require closer temperature control in heat-treatment than do some of the other alloy analyses; but aside from this they present no special problems. Their cold- and hot-working properties are considered at least equal to those of ordinary alloy steels. In cases where boron makes possible a lower alloy content, improved machinability frequently results.

If you would like to know more about boron and its effects in alloy steels, you are invited to consult with Bethlehem's metallurgical staff. Our technicians will gladly give you all the information you need, and will work closely with you in every respect. And when it is time to replenish supplies of steel, remember that Bethlehem manufactures the full range of AISI standard alloy grades, as well as special-analysis steels and all carbon grades.

If you would like a reprint of this advertisement, or of the entire series from I through XV, please write to us, addressing your request to Publications Dept., Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

DIGEST OF THE WEEK IN METALWORKING

June 14, 1956—Vol. 177, No. 24

The IRON AGE

Digest of the Week in Metalworking

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Address mail to The IRON AGE
Chestnut and 56th Sts. Philadelphia 39, Pa.

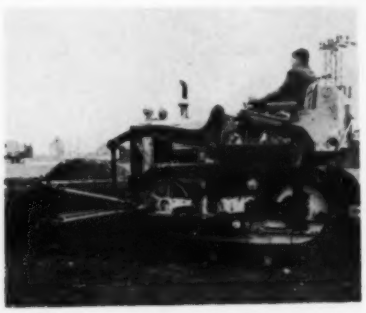
NEWS DEVELOPMENTS

STEEL TALKS LOOK LIKE POKER GAME **P. 58**

Lots of bluffing but little tipping of hands as steel companies, steelworkers start negotiations. USW make big demands, but have little chance of getting what they ask for. Real negotiations are going on behind the scenes.

BIG BOOM FOR CONSTRUCTION EQUIPMENT **P. 60**

Government highway program means big future orders. New record is al-



ready in sight for this year, another rise is in line for 1957. Makers of earth moving equipment plan new expansion and broader lines of products. Competition gains.

SPARE TIRE SOON MAY BE JUST A MEMORY **P. 72**

Development of new tire-within-a-tire could eliminate need for carrying a spare. This would mean rear deck of cars could be redesigned.

WHAT'S NEW IN PLANEMAKERS' METHODS? **P. 81**

Aircraft industry production wrinkles can be valuable if you're looking for new ideas and ways to cut costs. Here are some of the latest used in the plants on the West Coast.

Industry is currently concerned with the case of the disappearing dimensions. Something is missing, but no one is interested in finding it, because the culprits are inefficient size and weight. Special feature begins on page 55.

ADMINISTRATION SPLIT ON MERGER NOTIFICATION BILL P. 77

Divisions on merits of this measure have brought its progress to standstill. Many feel the provision requiring firms planning unions to give 90 days' notice would result in "leaks" while investigations were being carried on. Commerce Dept. argues that mergers encourage competition.

FEATURE ARTICLES

TRYOUT PRESS PUTS SQUEEZE ON DOWNTIME P. 95

A single 150-ton hydraulic press solves the problem of production die tryout—without interfering with production. By holding shop downtime to a minimum, it has more than paid for itself in a year. Versatile, this press can handle dies up to 72 in. long, 30 in. wide including progressive and deep-drawing dies. Here's a positive approach to solving die problem wrinkles without snarling production.

BRAZE STRONG JOINTS WITH SELF-FLUXING ALLOYS P. 98

Braze without flux with new lithium-bearing alloys. Join metals like stainless, nickel and cobalt-base alloys without use of reducing atmosphere. Braze in air, at least the common low-carbon steels. Here's a multi-purpose brazing alloy that joins a long list of materials from metals to ceramics, including titanium.

HOW TO CHOOSE THE BEST DRAWING LUBRICANT P. 102

At first glance, the number of drawing compounds used in modern press-working seems limitless and confusing. How do you go about finding the best for a particular metal and a particular job? This article groups lubricants into three basic classes; from there follows current best practice for ferrous, non-ferrous metals.

SYSTEMATIZED APPROACH PAYS HANDLING PROFITS P. 105

Integrated handling is the theme of today's material handling strategist—systematization in tackling plant problems, rather than the old sniper approach. Automation demands it. And automated or not, the trend is definitely in that direction. Here's what some of the country's front-running experts had to say at the technical sessions staged with the Cleveland Handling Show last week.

GIVE SHEET HANDLING A LIFT WITH MAGNETS P. 108

Sheet steel handles awkwardly. And low-cost equipment to mechanize the job is hard to come by. Manhandling is too often the answer. But there's another—permanent magnets. Magnets can simplify and speed feeding sheet to machines, while lessening chances of worker accident.

MARKETS AND PRICES

METAL BORES INTO WOOD FURNITURE MARKET P. 61

Growing popularity of aluminum outdoor and black iron indoor furniture is putting chips into the pockets of metal fabricators. Industry trebles its income in 10 years.

GRIPES OF NICKEL USERS ARE GETTING RESULTS P. 62

Senate committee hearings air complaints against priority system. Small consumers claim they are paying premium prices. There's a strong possibility that new allocation techniques may be introduced in not-too-distant future.

ELECTRICAL STEEL OUTPUT IS EXPANDING P. 63

Competition is increasing in the grain-oriented silicon steel market. U. S. Steel and others expand output or enter field for first time. Steady demand tied in with growing power and utility industry. Improvements are on the way.

NEW STANDARDS FOR RATING GEAR STRENGTH P. 83

American Gear Mfgrs. Assn. takes initial step by considering formula on bending stress and load carrying capacity. Committees are set up at the annual meeting to develop other rating standards.

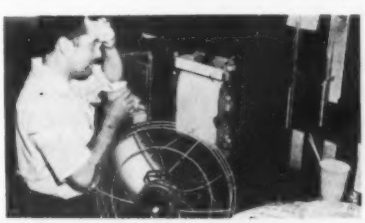
LACK OF STEEL DELAYS CONSTRUCTION PROJECTS P. 155

While there is an abundance of some steel products, shortage of plates and structurals is hampering construction. Situation likely to get worse as new highway program takes hold. Labor uncertainty begins to take effect in lower steel output.

NEXT WEEK:

WHAT CAN YOU DO TO BEAT THE HEAT?

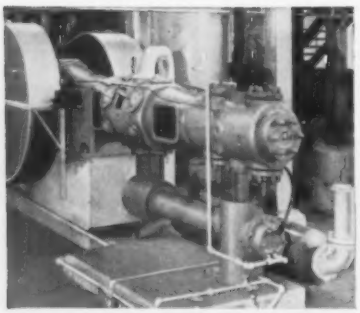
With hot weather here, a primary problem is minimizing adverse effects of hot weather. An IRON AGE survey report to management tells some of the latest innovations as well as proven methods of fighting heat.



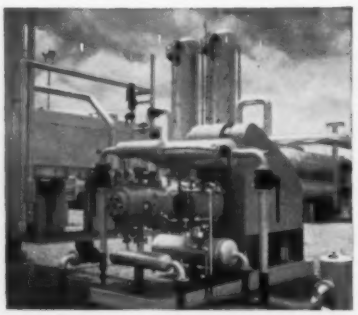
For jobs like THESE

CHOOSE HEAVY-DUTY ES COMPRESSORS

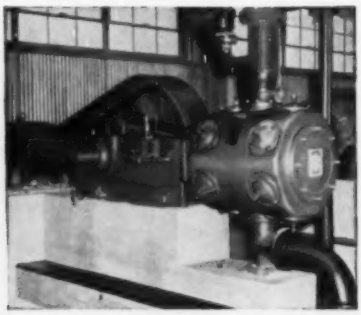
for pressures to 2500 psi—sizes 5 to 150 horsepower



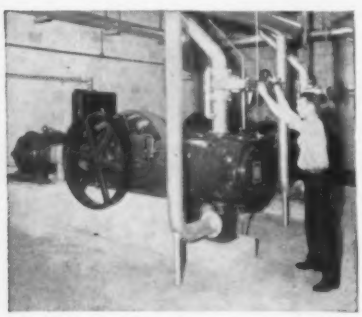
SOOT BLOWING The steam power plant of a large paper mill uses this ES to furnish high pressure air for boiler-tube soot blowing. This V-belt driven 125-hp unit compresses air to 350 psi in two-stages.



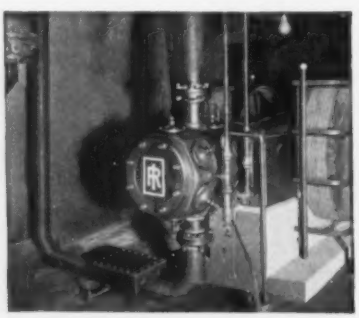
PROCESS GAS COMPRESSION In this unique outdoor installation, a two-stage ES compressor with V-belt drive compresses still vapors in a large modern gasoline plant.



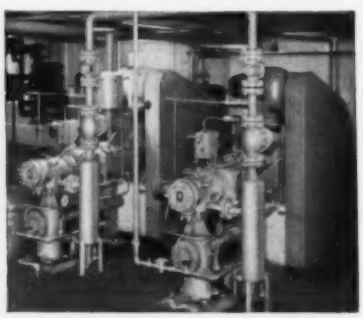
AIR LIFT SERVICE Shown here are two of the three Ingersoll-Rand ES compressors installed in a copper mine to provide pressure for elevating acid from the bleaching tanks by the air-lift principle.



GLASS MOLDING Here in a large lamp manufacturing plant, two ES compressors supply 50-psi air for cooling gas furnaces and for high pressure gas jets used in glass molding. Pressure is reduced to 30 psi to drive air-motor driven agitators.



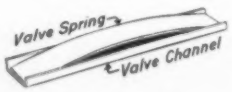
BOOSTER SERVICE Installed on the 4600 ft level of a large mine, this Ingersoll-Rand ES compressor boosts air pressure to get full power out of rock drills and other air-powered equipment.



AIR STARTING SERVICE A large transcontinental pipeline station uses these two ES compressors to supply 250-psi starting air to its I-R gas engine compressors. Both have overhead motors and one unit is provided with a standby gasoline engine.

SHOWN here are just a few of the countless ways in which Ingersoll-Rand heavy-duty ES compressors are serving industry. A wide range of standard cylinder arrangements and types of drive enables them to meet virtually any operating conditions within their size and capacity limits. Their efficiency is high and operating and maintenance costs low. Ask your I-R representative for help in solving any compression problem.

Only I-R compressors have CHANNEL VALVES



Known for high efficiency, quiet operation and almost unbelievable durability. Entirely different. Each valve is a combination of rigid stainless-steel channels and leaf springs, with trapped-air spaces which give cushioned action.

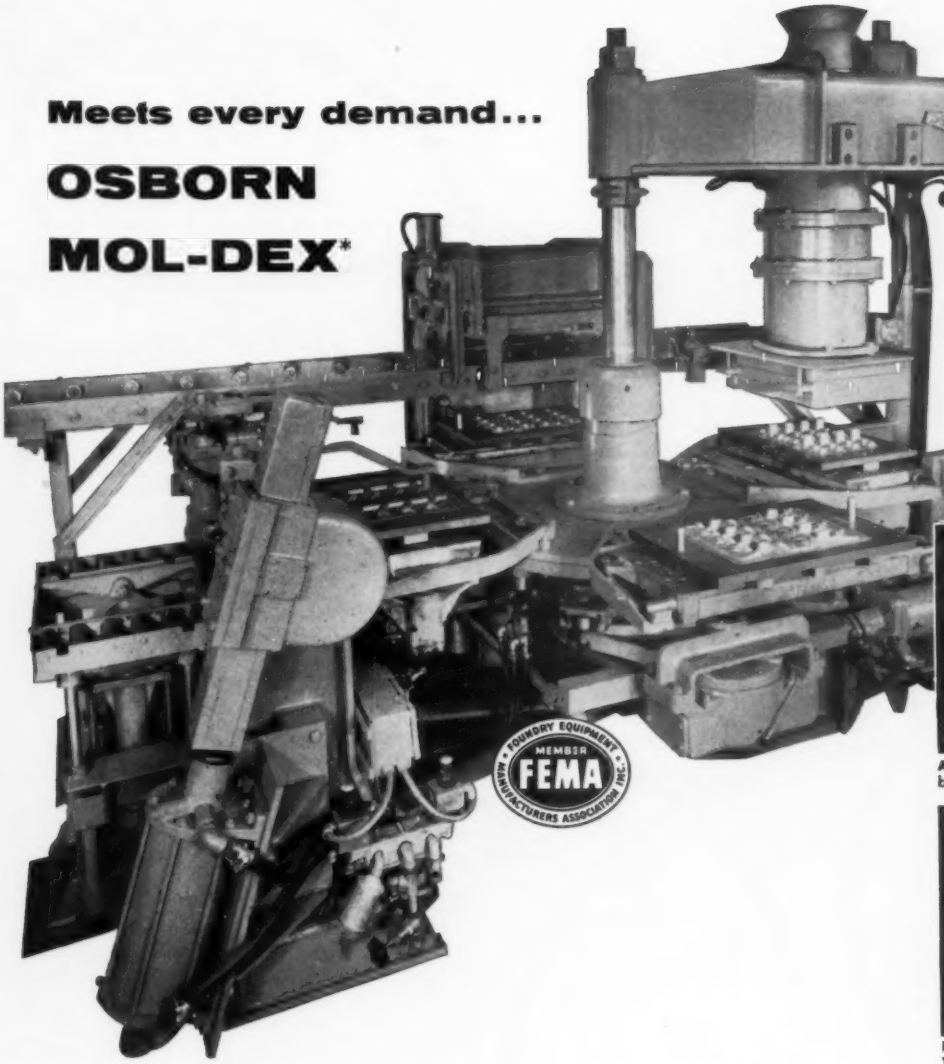
Ingersoll-Rand

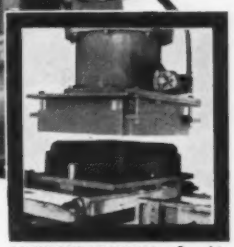
1-394 **11 Broadway, New York 4, N. Y.**

COMPRESSORS • GAS AND DIESEL ENGINES • ROCK DRILLS • PUMPS • TURBO-BLOWERS • AIR AND ELECTRIC TOOLS

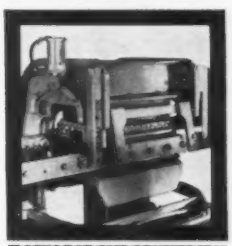
Meets every demand...

OSBORN MOL-DEX*

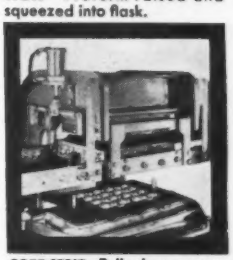




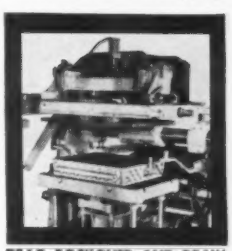
AT BLOW STATION—Sand is blown into preform cavity.



FLASK LOAD AND SQUEEZE STATION—Preform raised and squeezed into flask.



COPE STRIP—Roller bars engage flask rails for accurate stripping.



DRAG ROCKOVER AND DRAW—Drags indexed to third station for drawing.

New automatic molding machine offers you unequalled flexibility... highest production... greatest dependability

Now, for the first time, even semi-production foundries can take advantage of the economies of automatic molding.

Today's most flexible molding machine, MOL-DEX is the *first* to incorporate the stripping of copes and rockover of drags in a single piece of equipment. Floating platen permits quick pattern changes.

MOL-DEX is the result of Osborn's advanced engineering, precision manufacture and knowledge of applications . . . your three guarantees of dependability. *The Osborn Manufacturing Company, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

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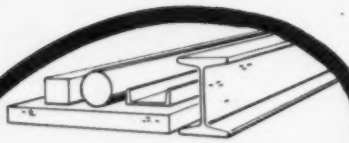
OSBORN *Leader in automation for the foundry*

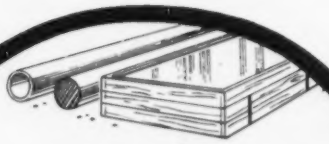
Core Blowers Molding Machines
Industrial Brushes

call Ryerson for steel



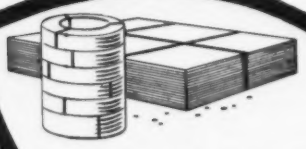
CARBON STEELS

Hot rolled and cold finished bars; channels, angles, beams, etc.; plates of every kind.



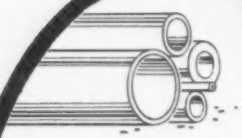
STAINLESS STEELS

World's largest stock of sheets, plates, bars, pipe, tubing, fittings, etc.



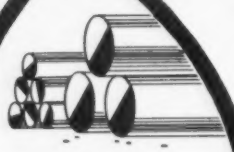
SHEET AND STRIP

Over 20 kinds and many gauges—in pattern sizes or cut to your order.



TUBING

Mechanical and pump cylinder tubing, seamless and welded; hydraulic fluid line and boiler tubes; structural tubing, etc.



ALLOY STEELS

Tested alloys of known hardenability, standard and aircraft quality, as rolled, annealed, heat treated.

Quick delivery from nation's largest stocks

Need steel in a hurry? Ryerson stocks are the nation's largest, so one call to your nearby Ryerson plant brings quick delivery of almost any kind of steel in almost any quantity—all of it certified for high uniform quality.

Do you want your steel prepared for immediate use? Ryerson facilities include the most modern close-tolerance equipment for sawing, shearing and flame cutting to your specifications.

Of course, current heavy demand makes it difficult to keep all sizes always on hand but our stocks are being replenished continuously. Steel that's out of stock today may be in stock tomorrow. And experienced Ryerson steel men will help you make the most of steel on hand. So for everything in steel and steel service . . . call Ryerson.

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Indexed in the Industrial Arts Index and the Engineering Index.

EPA NBP

EDITORIAL

The People Should Be Told!

◆ OUR COUNTRY'S position in defense, air power, world leadership, and foreign relations is anything but clear. It is almost impossible to know just where we stand in these important fields. It is time we were told with facts—and quickly.

Hailing chiefs of staff and service secretaries before the press en masse was ridiculous and helped no one. Such nonsense will not stop interservice rivalries. It is even open to question if we want to—or can—bottle up such rivalries.

American scientists have confirmed that the Reds are ahead of us in pure research; the type that leads to important breakthroughs on defense and commercial problems. These sources assert also that we are trailing the Reds in engineering graduates.

Our leadership is crumbling in Asia. In England we see our major ally open up more strategic trade with Red China. In Europe there is a lessening of caution towards the Communists. Even throwing money around the world does not get us the friends we need.

At home we have a ho hum and a yawn for such basic and critical challenges. It is time for us to worry about them. But we won't unless we are aroused with the facts—and a warning.

Bulganin and Khrushchev—those students of the late maniacal Stalin—are a reasonable facsimile of the old butcher. They are in the saddle with the latter appearing to have made the grade as the "strong" man. They woo the world with "friendship" and they are having luck lulling Asia to sleep.

An awakening is overdue the average citizen. We should take the military out of politics. We should find out for sure if we are spending enough—and wisely—for defense.

We need leadership, not confusion. We must have truths, not half truths. We require hard words, not pap. We crave discussion and dissemination of the news and facts, not vague statements and reluctant disclosures.

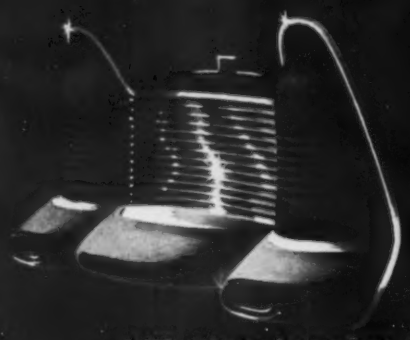
If it takes a presidentially appointed committee of distinguished national leaders to find the answers, let's be about it quickly.

Time—without truth and action—is not on our side!

Tom Campbell

See Special Editorial, P. 59

EDITOR-IN-CHIEF



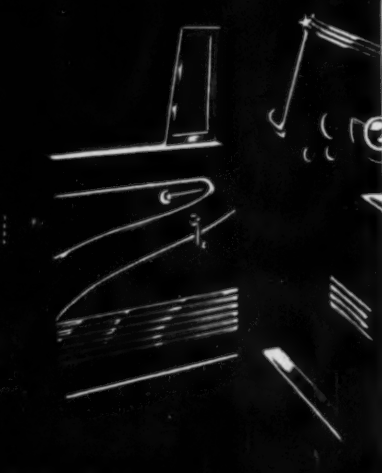
Lines

OF LEAST SALES RESISTANCE

• What do car buyers want in car finishes these days? Ask one who has just put the wax and polish back on the shelf and chances are he'll say, "Give me more stainless steel."

• More car dealers, too, are pointing to the stainless steel features. The reason is obvious. Car buyers realize the value of stainless steel. They like the way their trim returns to its new-car brilliance under the hose, and the way it resists road abrasion, denting and pitting. They like the idea of a solid metal—not simply a coating.

• Just as car buyers who know desire stainless, so do steel buyers who know specify Sharon stainless—the steel with the industry's finest finish—coil after coil.



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dear editor: *letters from readers*

Confidence Boom

Sir:

Your editorial of May 17, 1956 hit straight at one of the major problems of the business man today. We lose confidence too easily—in ourselves, in our work, in the future—even when the facts clearly state otherwise. A little confidence today can mean the difference between success and failure tomorrow.

I am planning to use this article in the next issue of our Association Newsletter, in the hope we can add our bit to converting prophets of "Gloom and Doom." *J. C. Kelley, General Mgr., American Machine Tool Distributors' Assn., Philadelphia, Pa.*

Dollar Series

Sir:

We would like to obtain three copies of "How to Get More For Your Welding Dollar," in the April 26 issue.

Our company is a regular subscriber, and we would like to compliment you on the publication in its entirety. Much information and knowledge has been gained by us through this magazine. *R. R. Buck, Asst. Chief Engineer, Trackson Co., Milwaukee, Wis.*

Sir:

Please forward me 15 copies of your March 8 article "How to Get More For Your Tooling Dollar."

I find this a wonderful help in getting across to our tooling men the ways and means of reducing tooling costs. *G. R. Page, Supervisor, Apparatus Dept., Canadian General Electric Co., Ltd., Peterborough, Ontario.*

Sir:

I would like to have a copy of the special feature appearing in the March 8 issue "How To Get More For Your Tooling Dollar."

I would like to take this opportunity to say this is one of the most outstanding articles I have had the opportunity of reading for a considerable length of time. *H. L. Printz, Mission, Kansas.*

Talent Developer

Sir:

I wish to express my satisfaction with the Special Reports which IRON AGE runs. They are well written and have proved very useful.

Also, will you send me three copies of the Special Report "How To Grow Management Talent"

Walter Semlow writes on Management.

which appeared in your May 31 issue. The subject is particularly fitting at this time and we look forward to having it studied carefully by our people. *Frank Katz, Washington, D. C.*

Sir:

Please send us 10 individual reprints of the May 31 article, "How To Grow Management Talent" by Walter J. Semlow. It is one of the most practical articles, on the subject, which we have read. *B. F. Yount, Training Director, International Harvester Co., Motor Truck Div., Chicago, Ill.*

HOW DOES GARRETT GIVE SUCH SERVICE?

What others may call impossible Garrett comes through as routine service. It seems as though they treat each order as the only one in their three plants. Everybody pitches in for service with the customer in mind.

If it is a stock item such as lock washers, flat washers, spring washers or hose clamps the order is usually on the way the same day. If it is stampings or assemblies Garrett engineers, production men and die makers team up to make their high-speed automatic equipment really hum . . . and your order is in your hands in half the time.

Want to be surprised by real service you can't beat? Next time send your order to Garrett for . . .

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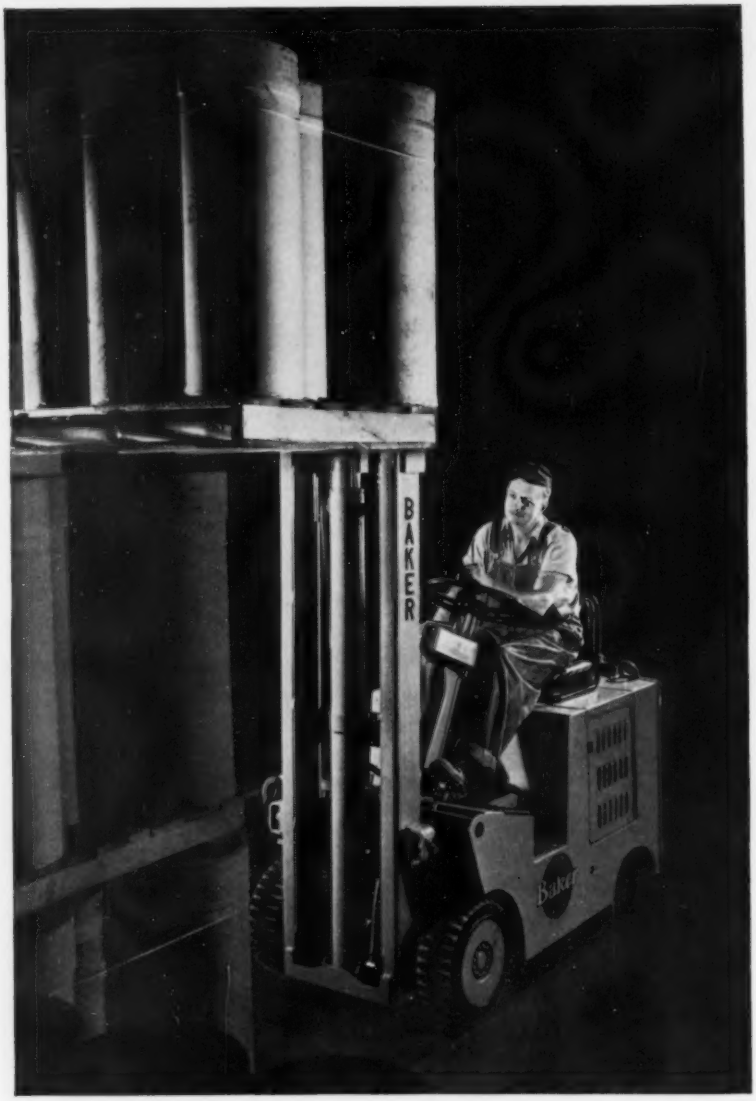

here's why...

Every step in the design of the new Baker "FG" gas fork truck was aimed at this end result: Maximum dependable and efficient performance, and longest life. The power plant, for example, is a heavy-duty gas engine designed expressly for rugged industrial truck service, power rated to truck capacity and geared to operate at optimum RPM. Compact rigid power train without troublesome universal joints... split clutch housing for better accessibility... single oil supply for entire assembly... full-floating, self-energizing, self-equalizing hydraulic brakes with one-point adjustment... these are a few of the features that mean *more time on the job.*

Our confidence in the "FG" is backed by a full 6-months' warranty—the only gas truck offering this protection. Capacities up to and including 6000 pounds. Write for specific bulletins.

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6G-1

fatigue cracks

by William M. Coffey

Cure Your Cares

Man named Jim Smith of Port Arthur, Texas, writes of a little stenographic problem he had. Seems he wrote a memo quoting an article from our April 12 issue, "CO_2 Cures Cores in Seconds." It came back typed "CO_2 Cures Cares in Seconds." We've heard of doing this with oxygen; you can sniff O_2 from a vending machine at the Columbus, Ohio, airport. Supposed to cure convention-induced headaches. Pretty effective too.

The same article also cured the cares of a foundry that had been having core curing trouble. That is, one foundry we know of and that took the trouble to write and say so.

How to Beat the Heat

Everybody talks about the heat—or they soon will be. But unlike the weather, people are doing something about it. The problem of doing something about it in industry is not as simple as ordering a window unit for your bedroom. Generally speaking, it is not yet practical to cool an entire industrial plant.

Short of cooling the whole plant, what can you do to make things more pleasant for your people—and just incidentally increase production, reduce rejects, cut absenteeism, etc.?

Couple of months ago—when the snow was still on the ground, the editors started looking into what's been done in industry about hot weather. Idea was to show reasonable and practical steps that many a plant might take to boost efficiency during the dog days.

Besides checking the usual sources—people who make coolers and fans and evaporators and air conditioners and insulation and so forth—they decided to ask plant managers what they had done. With about a thousand replies on hand they feel they'll have some very practical hot weather suggestions to offer you. Watch for "How to Beat the Heat," a new survey report to management—coming next week.

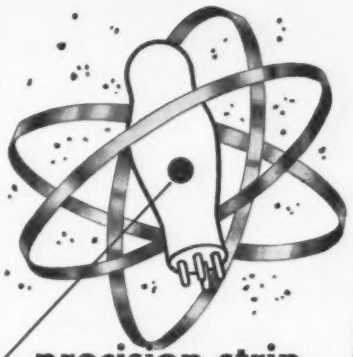
Impossible

Speaking of mottoes, which we have been doing here from time to time, here's another. Came in from R. E. Moulton of Caltech's Jet Propulsion Laboratory at Pasadena in form suitable for framing. We couldn't reproduce the original but here is the wording:

They told him the job couldn't be done. He rolled up his sleeves and went to it. He tackled the job that couldn't be done . . . And couldn't do it . . .

Puzzlers

The solution to the hermit puzzle is a cinch if you tie the goose to the canoe and let him swim back and forth. If you don't do that, you will never get across the second stream. The bright boys on this one were: R. E. Crabtree, Dallas, Texas; William P. Mass, Chicago, Ill.; D. M. Ertner, Western Electric, St. Paul, Minn.; and John Spiggle, Otto Bernz Co., Rochester, N. Y.



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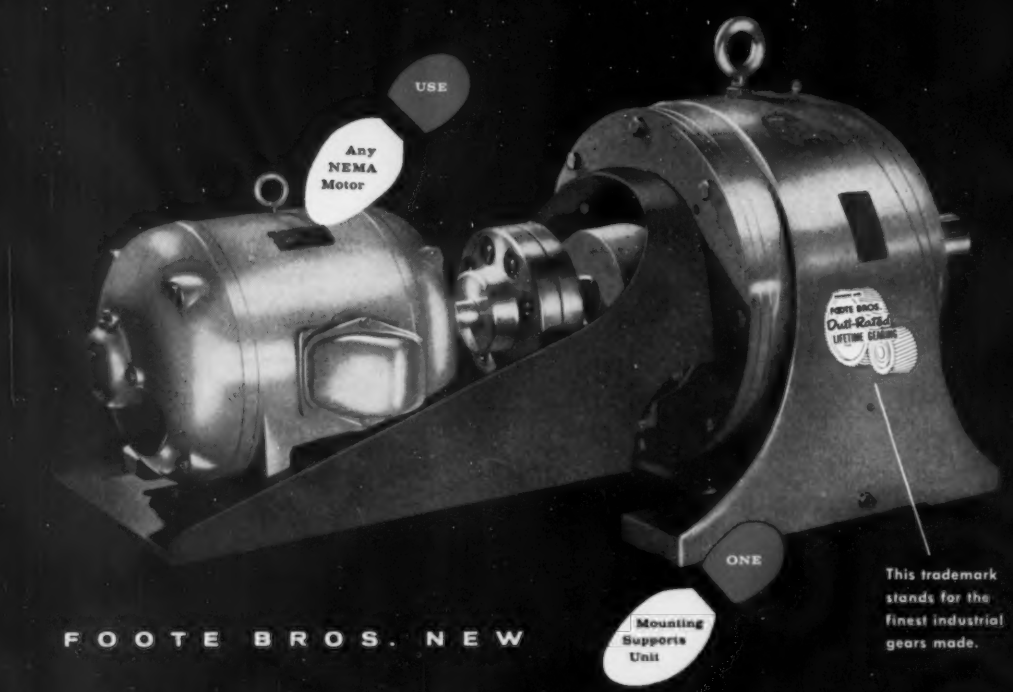

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dates to remember

JUNE

THE NATIONAL ASSN. OF METAL FINISHERS — Annual meeting and fifth management seminar, June 17-18, Mayflower Hotel, Washington, D. C. Society headquarters, 35 E. Wacker Dr., Chicago.

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS — Semi-annual meeting, June 17-21, Hotel Statler, Cleveland. Society headquarters, 29 W. 39th St., N. Y.

MATERIAL HANDLING INSTITUTE—3rd annual material handling training conference, June 17-30, Lake Placid, N. Y. Society headquarters, 813 Clark Bldg., Pittsburgh.

EXPOSITIONS

ASSN. OF IRON & STEEL ENGINEERS, Sept. 25-28, Cleveland.

METAL SHOW—Oct. 8-12, Cleveland.

AMERICAN ELECTROPLATERS' SOCIETY—43rd annual convention, June 18-21, Hotel Statler, Washington, D. C. Society headquarters, 445 Broad St., Newark, N. J.

AMERICAN MARKETING ASSN.—National conference, June 20-22, Hotel William Penn, Pittsburgh. Society headquarters, Aluminum Co. of America, Pittsburgh.

PRESSED METAL INSTITUTE — National sales conference, June 22, Hotel Carter, Cleveland. Society headquarters, 3673 Lee Rd., Cleveland.

AMERICAN SOCIETY FOR TESTING MATERIALS — 61st annual meeting, June 22-28, Hotel Statler, Boston. Society headquarters, 1916 Race St., Philadelphia.

ALLOY CASTING INSTITUTE—Annual meeting, June 24-26, The Homestead, Hot Springs, Va. Society headquarters, 32 Third Ave., Mineola, N. Y.

DROP FORGING ASSN.—Annual meeting, June 24-27, The Homestead, Hot Springs, Va. Society headquarters, 605 Hanna Bldg., Cleveland.

NATIONAL ASSN. OF COST ACCOUNTANTS—37th international cost conference, June 24-27, Conrad Hilton Hotel, Chicago. Society headquarters, 505 Park Ave., New York.

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If your plans call for an all-electric crane in 1 to 20-ton capacity, be sure to see our catalog of Series "D" 'Load Lifter' Cranes. These cranes are standardized and mass produced for average industrial needs. They are built in three basic types. There are three styles of trolleys and spans range up to 80 feet. You can have cage or floor control. Whatever type and capacity is required, you can order by number from the catalog. And, you will find prices much lower than those of other cranes for similar service.

Series "D" 'Load Lifter' Cranes have many plus-value features that contribute substantially to long life, complete safety and economical performance. A *three-girder* bridge is provided on cranes with moderate spans to prevent whipping and skewing; box-section welded girders assure extra rigidity in cranes with spans over 50 feet. Variable-speed magnetic control and fast-acting bridge brake make spotting easy. All gearing operates in oil to minimize frictional wear. The bridge and trolley wheel axles rotate smoothly on anti-friction bearings.

Series "D" 'Load Lifter' Cranes have many other design and operational advantages essential to assure dependable service. Write for Catalog 221 and see for yourself why these rugged cranes are outstanding in value and price.

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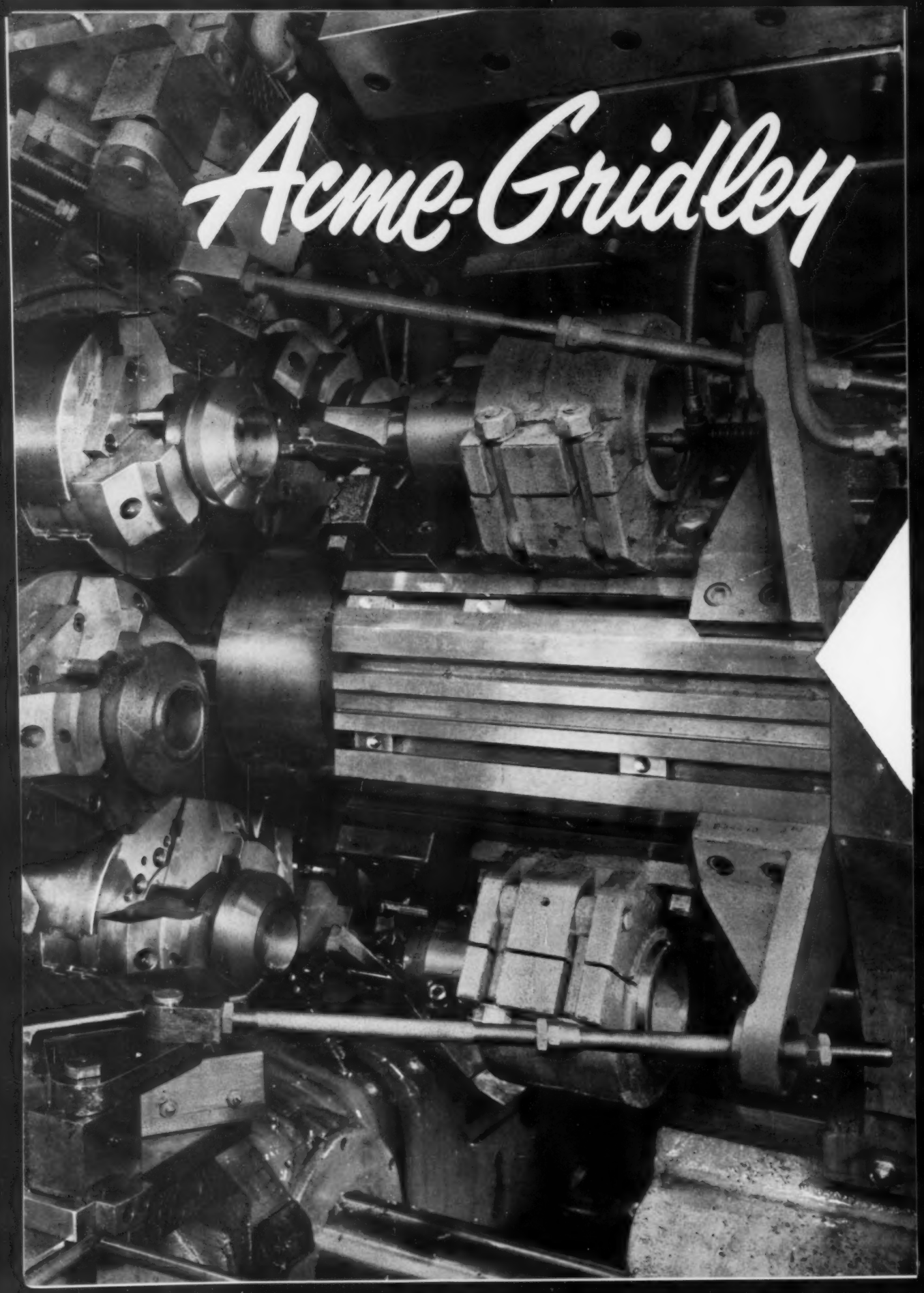
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sound basic design

means greater production at lower cost

Accurate alignment of the tools and the work, every time the carrier indexes—and the rigid maintenance of this very precise alignment throughout every machining operation—provides greater precision all day long, less inspection, fewer rejects.

This accuracy resulting from sound basic design is one of the many reasons why Acme-Gridleys are setting new records for consistently accurate production every day.

- Spindle carrier integral with stem.
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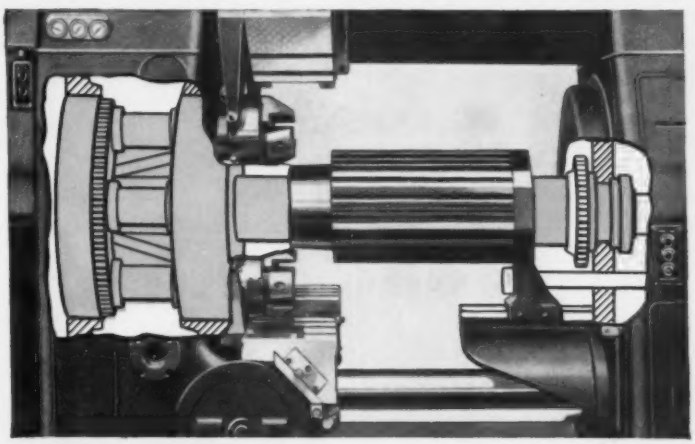
- Two wide spindle carrier bearings in headstock frame and a heavy-duty bearing in gear box provide maximum support.



LET US TELL YOU MORE ABOUT *Acme-Gridley* BASIC DESIGN

This is but one of many BASIC DESIGN features which are responsible for Acme-Gridley's outstanding performance records. May we send you additional information? Or, better yet, let us send a representative to discuss possible production short cuts with you.

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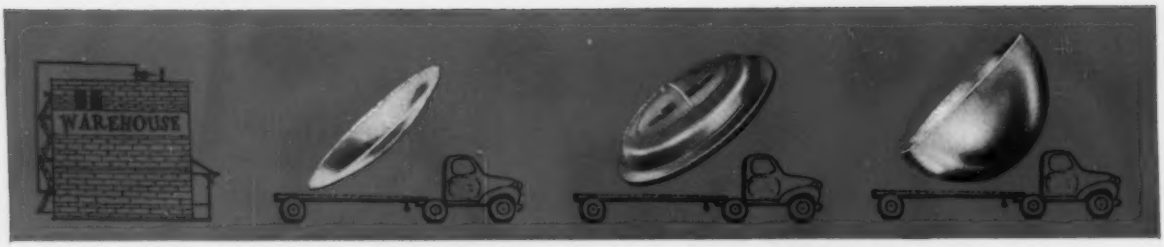

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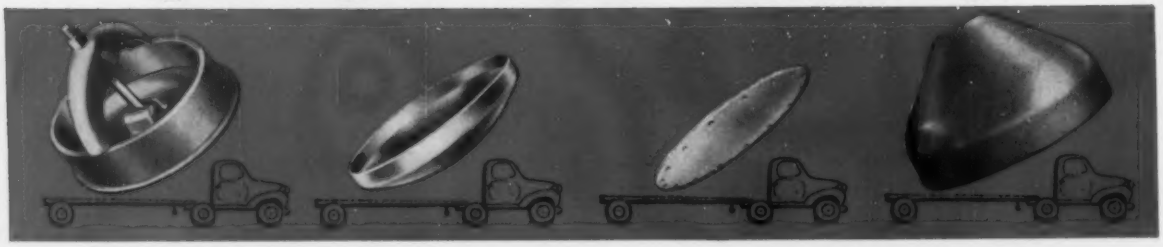

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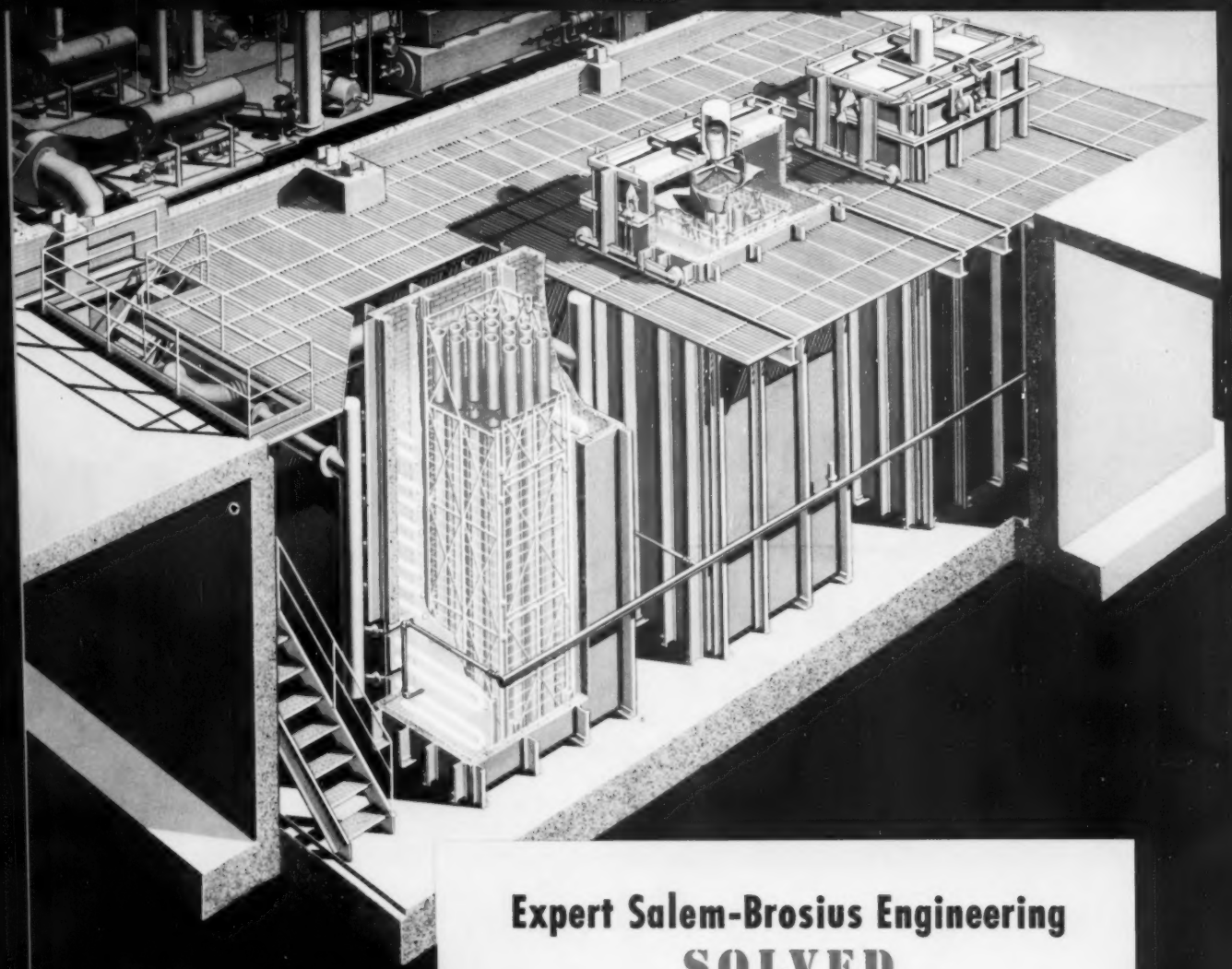

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The complex battery of pit-type heat-treating furnaces shown above, drawn to scale and cut away to show the heating action, was designed and erected by Salem-Brosius. They are radiant-tube, gas-fired, forced-circulation furnaces designed to anneal and normalize helicopter propeller tubes and other tubular section in a nitrogen atmosphere.

The first two furnaces in the battery anneal at 1350°F both round and elliptical alloy steel tubes at the rate of 1200 lb per hr. The third furnace has an equal capacity, but normalizes the tubes at 1850°F. These furnaces will handle lengths from 3 to 15 ft and diameters from 6 to 18 in., with either uniform or varying wall thicknesses. Elliptical tubes may range up to 22 in. on the major axis by 10 in. on the minor axis. The equipment seen in the background includes a nitrogen gas generator and gas scrubbing, refrigerating and drying units.

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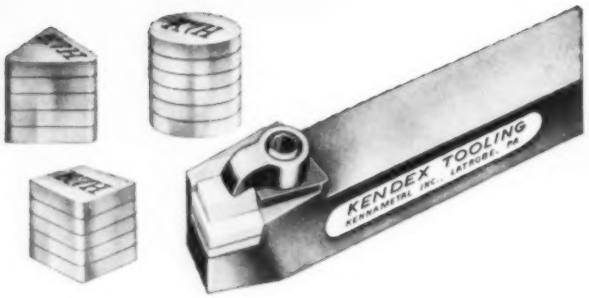
HERE'S HOW KENNAMETAL*

K7H

CAN FIT INTO YOUR MACHINING OPERATIONS



Kennametal Grade K7H, developed specially for modern high velocity machining and for cutting heat-treated high tensile alloy steels, is showing outstanding results on one new application after another. Its high hardness (93.5 Rockwell A) coupled with phenomenal strength (three times that of the nonmetallics) is proving effective over a considerable range of feeds, depths of cuts and other varied machining conditions. Here are examples:

1. At High Machining Velocities

K7H outperforms oxides at higher velocities: Cutting 4150 steel, K7H outperformed three different oxides, operating up to 1200 sfm. None of the three oxides stood up at that velocity—one broke down early, a second was satisfactory to only 750 sfm, and the third up to 1000 sfm. Grade K7H performed successfully up to 1200 sfm. It also produced freer cutting action, better finish, and showed no noticeable edge wear—even after one mile of cutting.

K7H outperforms other carbides at 1500 sfm: Run at 1500 sfm, cutting irregular flame-cut SAE 1045 steel of 210 Brinnell, Kennametal Grade K7H outperformed previous carbide, which was run at only 255 sfm. Feed increased to .021″ for K7H from .011″ for previous grade, at same ¼″ depth of cut.

2. On Heat-Treated and High Tensile Steels

K7H outperforms carbides on SAE 4340: One Kennametal K7H insert with six cutting edges on a Kendex holder completed finish turning and facing five 30″ O.D., 4″ thick plates of heat-treated SAE 4340 of Rockwell C 45–48 hardness, at average surface speed of 600 sfm. A competing premium grade required 3 to 4 cutting edges per plate running at only 400 to 450 sfm. In other words, one K7H edge did the work of three edges of the other carbide. Conditions: Depth of cut 3/32″ to 3/16″, feed .006″ to .008″, with 63 microinch finish required.

K7H more than doubles number of pieces per cutting edge: With K7H run at 750 sfm, it produced 18 pieces per edge as compared with 8 pieces per edge with a competing carbide run at 245 sfm. Other conditions were identical: Depth of cut ¼″, feed .011″, SAE 4140, 28 Rockwell C.

Why not have a Kennametal tool engineer help you take full advantage of this remarkably strong, hard Kennametal grade. Call him or write KENNAMETAL INC., Latrobe, Pennsylvania.

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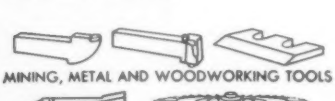

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FOR DEPENDABILITY AND ECONOMY, SHERMAN

IN ACTION, two stabilizer cylinders brace the Sherman Digger. All power is applied to the boom, dipper stick and shovel by the hydraulic lift, crowd, actuating and swing cylinders. As a result, cylinder pivot ends and hinge pins are in constant motion under heavy loads. Excellent physical properties of Republic C-1018 Cold Drawn Steel have proved more than equal to the task.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

SPECIFIES REPUBLIC COLD DRAWN STEEL

Sherman Products, Inc., of Royal Oak, Michigan, insists on reliability and economy in every part of the popular Sherman Power Digger. That's why Republic Union Cold Drawn Steel is specified for hinge pins and pivot ends of all hydraulic operating cylinders.

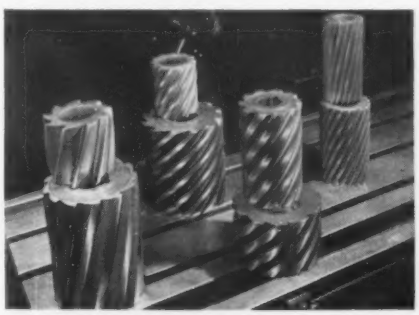
Whenever the digger is working, these parts are subjected to severe cyclic loading, transmitting all forces to the frame of the unit. Republic Cold Drawn Steel is ideally suited to this application since the cold finishing process materially improves the ultimate strength, yield point and hardness provided by the same analysis of hot rolled steel.

In addition to quality of product, Sherman gains three major production advantages. First, C-1018 has a high degree of machinability permitting rapid cut off, drilling for the pivot pin and facing to assure an accurate fit when the end is welded to the cylinder tube. Second, the inherently good cold drawn surface requires no machining to improve surface prior to painting. Third, C-1018 permits carburizing so that hinge pins can be given a very hard wearing surface without disturbing the tough shock-resisting interior.

Whatever your product or production problem—machinability, surface finish, accuracy of size and cross section or improved physical properties—it will pay you to investigate Republic Cold Drawn Steel. Get the facts from your local Republic Office or mail the coupon, today.

QUALITY FASTENER PRODUCTS like the hex head cap screws shown here are a century-old tradition at Republic's Bolt and Chain Division. You can choose from over 20,000 standard and 8,000 special types and sizes—all produced with precise quality control from raw ore to finished product to assure maximum dependability.

ECONOMICAL TRUCK TIRE RIMS are formed on special mandrels by the Cleveland Welding Division of American Machine & Foundry Company, in Cleveland, Ohio. Use of Republic Hot Rolled Carbon Special Sections assures strong, lightweight consistent-quality rims. Production time and money are saved by not buying excess metal and machining it away.



DEPENDABLE MACHINING OPERATIONS start with uniform quality tool steels. As a leading producer of tool steels, Republic maintains complete stocks including automotive die steels, precision ground flat stock and cold drawn shank steel. For one piece or a truckload delivered where you want it, on time—call Republic, or mail coupon for further information.

REPUBLIC STEEL CORPORATION
Dept. C-1672
3104 East 45th Street, Cleveland 27, Ohio

Please send me full information on:

☐ Cold Finished Steels ☐ Tool Steels
☐ Hot Rolled Special Sections ☐ Hex Head Cap Screws

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Company_____

Address_____

City_____ Zone____ State_____

STEEL
and Steel Products

New Literature AVAILABLE

BARDONS & OLIVER

No. 21

Saddle Type
UNIVERSAL
TURRET LATHE

2½" Bar Capacity
FOR HEAVY DUTY
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3" Bar Capacity
FOR MEDIUM DUTY
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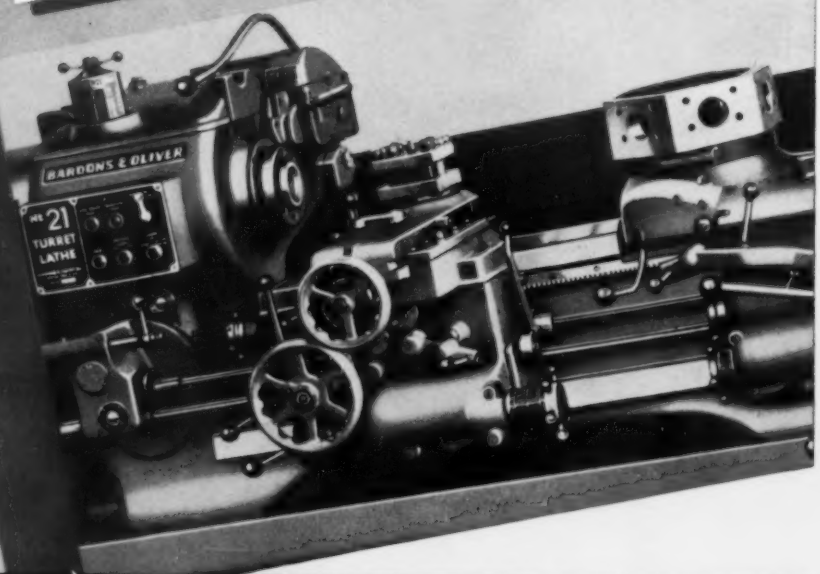
4½" Bar Capacity
FOR LIGHT DUTY
•
21¼" Swing Over Ways



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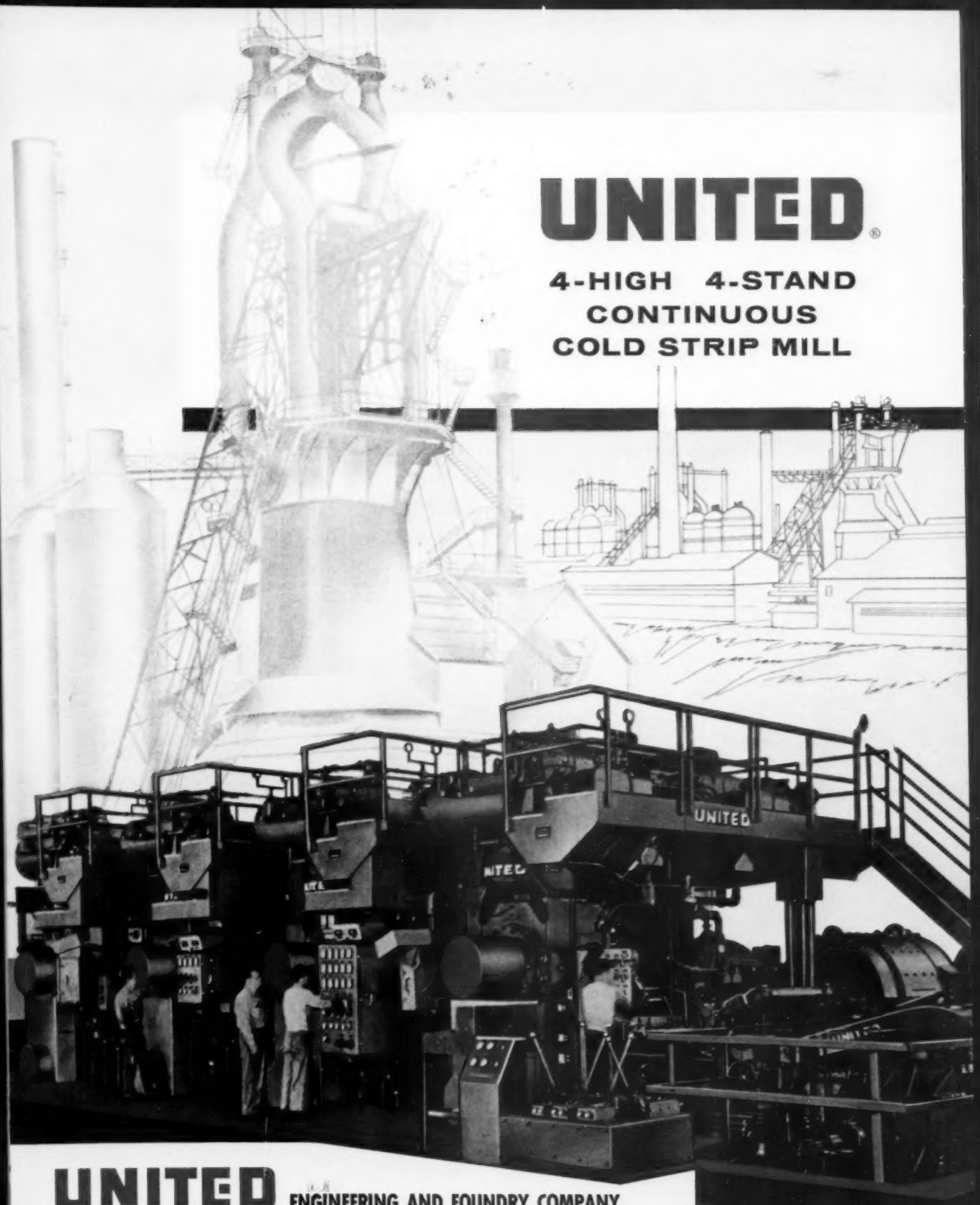
BARDONS & OLIVER, INC.
1136 WEST 9TH STREET • CLEVELAND 13, OHIO

UNITED®

4-HIGH 4-STAND CONTINUOUS COLD STRIP MILL



UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington (Lobdell United Division)
SUBSIDIARIES: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Company, Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

NEW! TYPE K-3 UNIVERSAL POTENTIOMETER

makes Precise Voltage Measurements easier than ever before

- **Scale reads directly in voltage**
- **Guarded against humidity, static, leakage of any kind**
- **"Thermal Free" circuit reduces voltage errors**

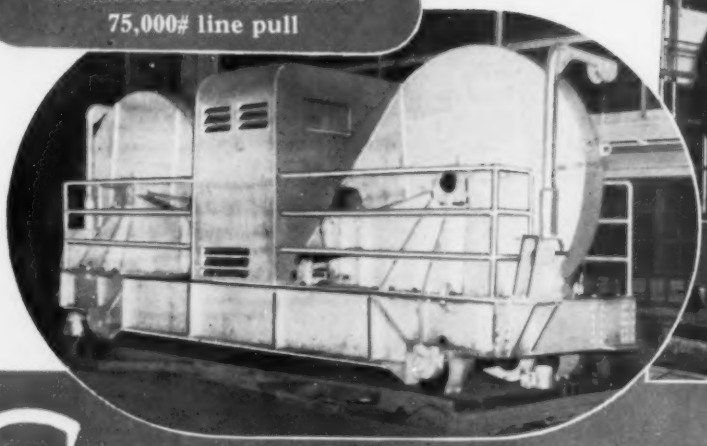
You take your readings directly from a central reading window . . . no more mental arithmetic in adding up dial settings. You can use this unique instrument in hot, humid weather . . . in cold, dry weather . . . without worrying about leakage or static.

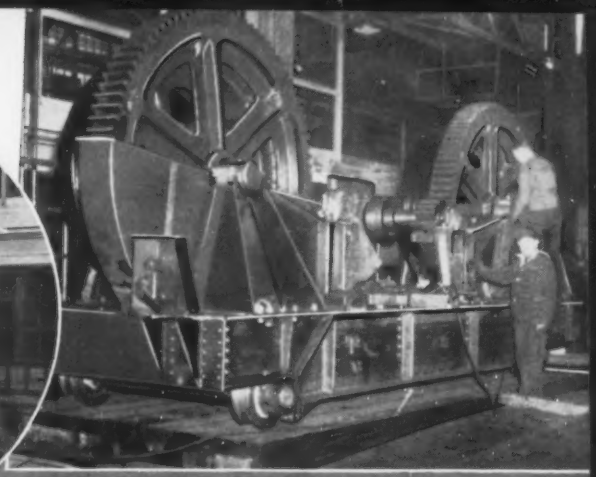
The many new design and construction features . . . metal case for electrostatic shielding . . . guarding of battery and detector circuits . . . enclosed switches and slidewires . . . thermal free circuit construction . . . central reading window . . . make this Type K-3 Universal (Guarded) Potentiometer the most advanced general purpose instrument available today. You will find it a worthy new addition to the Type K line . . . originated some 50 years ago . . . the world's most widely used precision potentiometers.

Six pages of data are required to give you full details. Ask for Data Sheet E-51(6); write your nearest L&N Office or 4956 Stenton Avenue, Philadelphia 44, Pa.

LEEDS [N] **NORTHRUP**
instruments *automatic controls • furnaces*

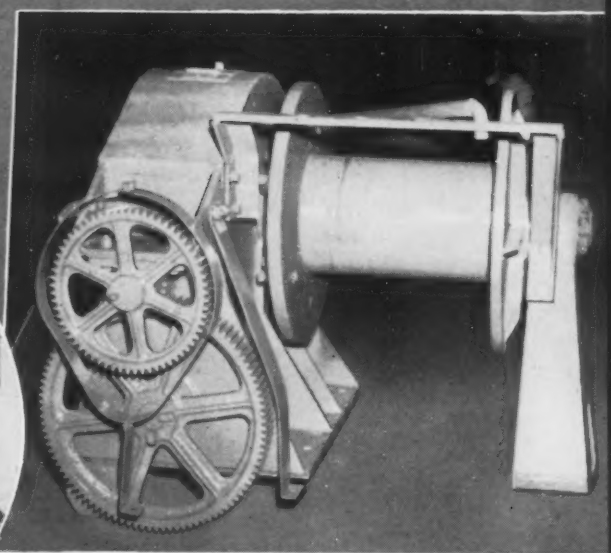
Double Drum—Fixed Hoist
75,000# line pull



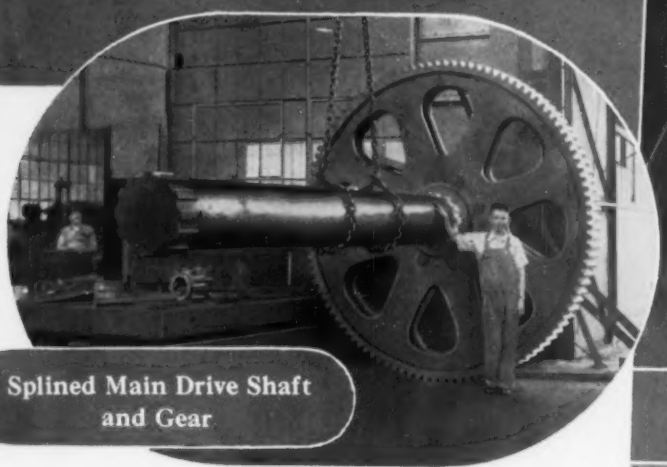


Traveling Hoist—Double Drum

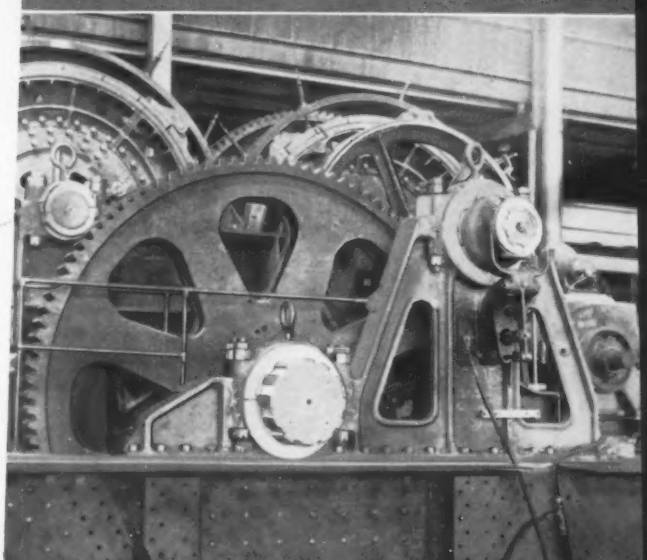
Special MACHINERY



Winch—18,500# line pull



Splined Main Drive Shaft
and Gear



Double Drum Hoist-100,000# line pull

These illustrations give you a small idea of the wide scope of work performed in this field by the Treadwell Construction Company. We welcome the opportunity of quoting upon your requirements for special machinery. Your inquiries sent to our main or district sales office will receive prompt attention. Bulletin gladly supplied upon request.

TREADWELL
construction company

Plant and Main Office — Midland, Pa.

SALES AND ENGINEERING OFFICES:
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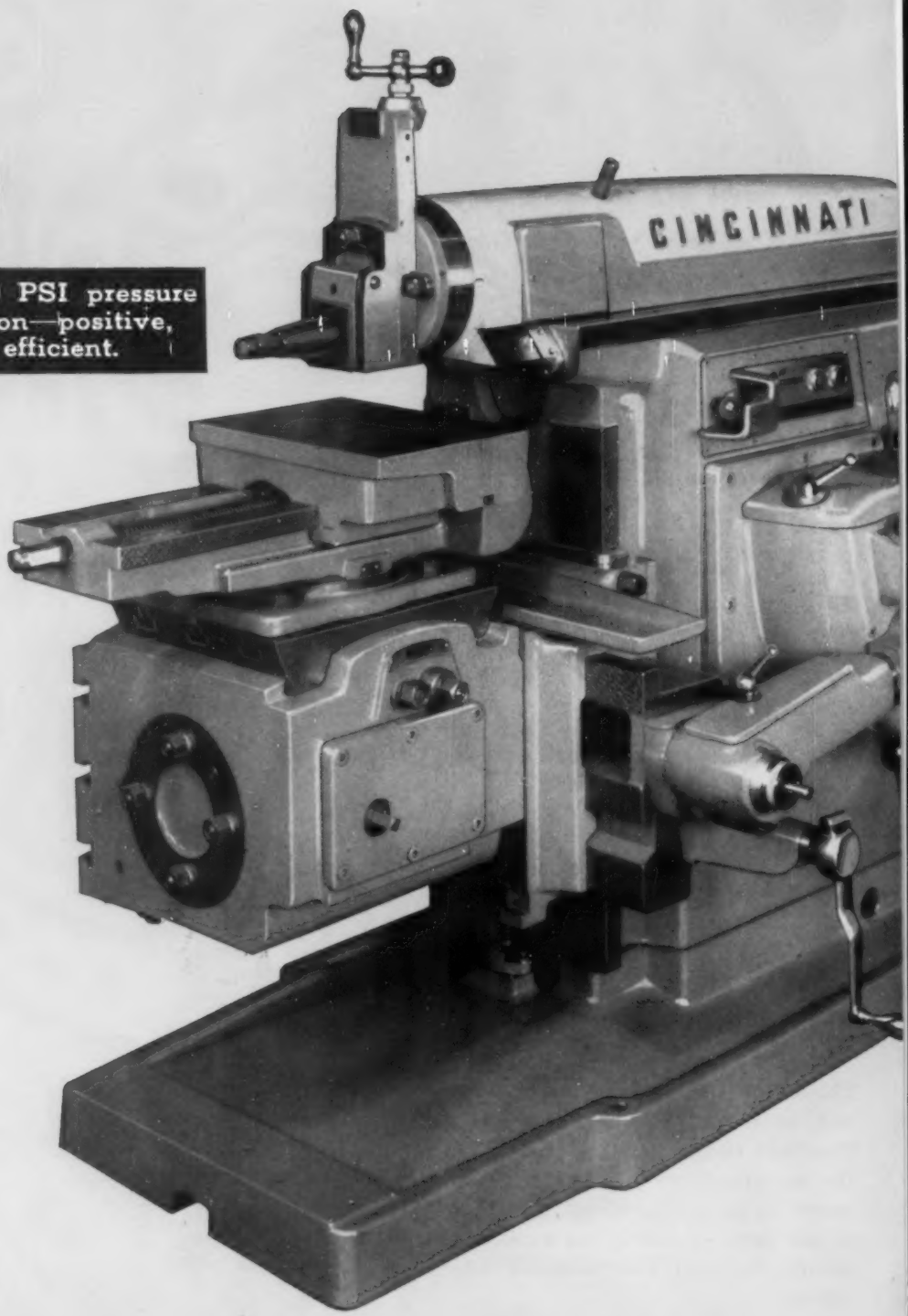
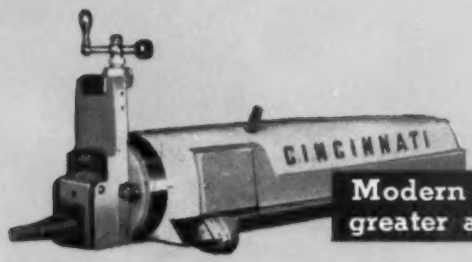
Modern 50 PSI pressure lubrication—positive, safe, efficient.



Modern brushless electro-magnetic brake and clutch—no adjustment required.



Modern nodular iron slot-free ram for greater accuracy.

CINCINNATI RIGID SHAPERS

Rigidity thru advanced design of column, ram, vise and trunnion permits smooth heavy cuts on these modern Cincinnati Rigid Shapers.

The most modern controls and oiling system give speedy performance and easy and positive operator control.

Furnished in 16″ to 36″ capacities.

WRITE FOR THE NEW DESCRIPTIVE BULLETIN.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

CINCINNATI

Walter Casler, left foreground, foreman of automatic production, and Les Danner, assistant purchasing agent, inspect Pittsburgh Steel Company high-carbon, oil-tempered MB wire at Raymond Manufacturing Company plant at Corry, Pa.

Peter Dubrosky, assistant to chief inspector at Raymond Manufacturing Co., Corry, Pa., plant, measures extension of a Westinghouse Laundromat tub spring during a quality control inspection.

You Own 1,000 Springs

Pittsburgh steel wire used by Raymond Manufacturing Co. in long-lasting Westinghouse Laundromat® Springs

One thousand springs of all sizes, shapes and functions are the property of the average home owner. And if the family car is included, the figure would be over 1,600.

Count the many springs in one popular model refrigerator. Add the tiny springs that control thermostats in electric or gas ranges. Throw in the three rugged springs that suspend the automatic washer's tub (if it's a Westinghouse Laundromat®).

Springs serve every day in dozens of ways—silently, surely and safely. Making them is a job requiring top-flight design, best quality materials, the latest coiling machines, plenty of experience and know-how.

A case in point—take one of the nation's oldest and largest spring makers, Raymond Manufacturing Company, a division of Associated Spring Corporation.

• **Three Vital Springs**—Raymond helped develop and now makes three vital springs which support the tub unit in Westinghouse Electric Corporation's Laundromat. A major supplier of the .207 oil-tempered MB wire from which the springs are coiled are Pittsburgh Steel's wire mills in Monessen, Pa.

Raymond meets Westinghouse's rigid specifications precisely. And Raymond officials give Pittsburgh wire credit for a strong assist.

Les Danner, Raymond's assistant purchasing agent who buys 2.200

sizes and types of materials at Corry, Pa. says:

"I'm fully sold on the quality of Pittsburgh Steel's wire. Pittsburgh Steel has become a major supplier for us because its quality is tops."

Walter Casler, foreman in the automatic production department, has 26 years of experience behind him when he says:

• **"Best I've Ever Seen"**—"I don't ever recall a rejection of Pittsburgh Steel's wire for quality. Pittsburgh's oil-tempered, especially, is some of the best wire I've ever seen."

Raymond must depend on the quality of the wire when making the Laundromat springs. These springs are coiled extension springs, tapered at one end to a bell shape. Two of the three springs on each tub are 6⅜ inches long, 2½ inches O.D., and weigh one pound, seven ounces each. The third spring is smaller.

The two larger springs must be capable of supporting 52 pounds at 9½" extension. At 11⅞ inches, they must carry 78 pounds. Because the three springs are the main support of the tub unit in the Laundromat, they must be both load-supporting and vibrating springs.

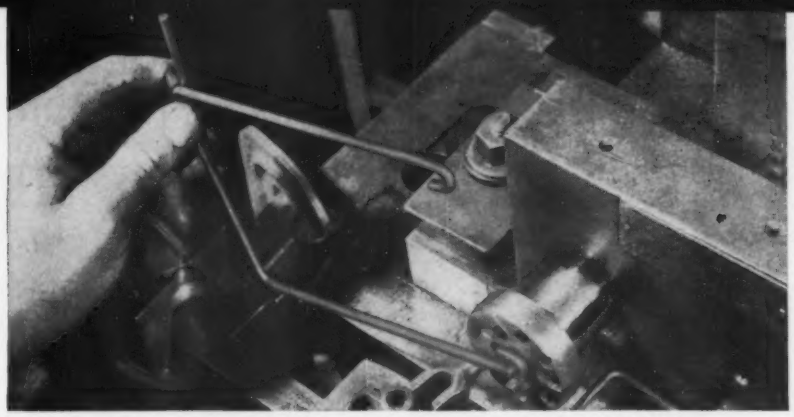
• **Surface Quality Counts**—If any of the three springs fails in use, the cost would be the expense of a complete dismantling to make repairs. That's why Raymond has installed a number of quality control inspections and tests throughout the production process.

Pittsburgh Steel also is Raymond's major supplier of hard-drawn, high-carbon MB wire. Pittsburgh Steel ships to Raymond tons of basic, bright, low carbon wire as well.

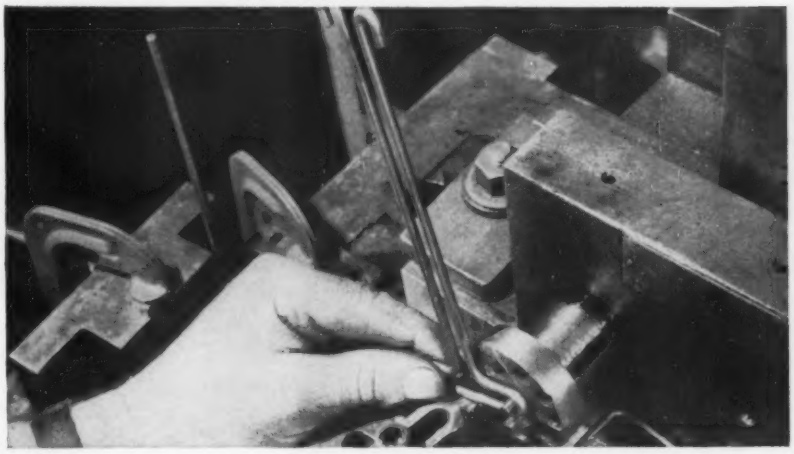
Raymond's experience with Pittsburgh Steel wire has been duplicated in many other plants across the nation.

Pittsburgh Steel's range of wire products can fit quickly, profitably into your operations. Its 50 years of experience in quality wire-making, its willingness to give service, its own extensive facilities and those of its subsidiary, Johnson Steel & Wire Company, can be the answer to your wire problem.

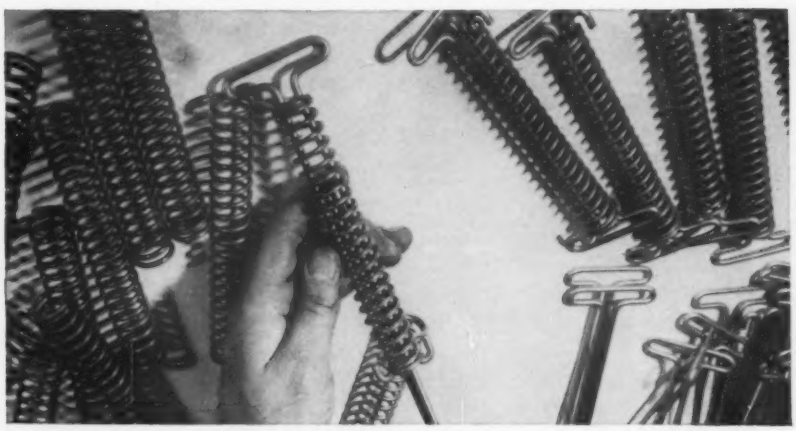
There's a national sales staff at your disposal. Contact any member of it today.



1. An 18⅛ inch piece of Pittsburgh Steel Company's .162 bright low carbon basic wire is hook wound on either end before being formed into a drawbar for extension spring on boat trailer.



2. Fourth and final forming operation in making drawbar is to form the loop.



3. Drawbars are inserted in opposite ends of 5⅞ inch spring to form unit. Spring is made from .105 hard drawn wire.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

District Sales Offices

Atlanta	Columbus	Detroit	New York	Tulsa
Chicago	Dallas	Houston	Philadelphia	Warren, Ohio
Cleveland	Dayton	Los Angeles	Pittsburgh	

HOW JOHNSON* MAKES A BETTER OUTBOARD MOTOR WITH ALCOA SCREW MACHINE STOCK

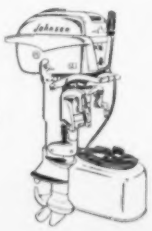
The outboard motor of 1921 was a heavy iron and brass thing that literally shook a boat to pieces. In that year, Johnson Motors and Alcoa changed the whole picture. The first Johnson Waterbug combined astounding lightness (35 pounds) with unheard-of power (2 hp) in a radical twin cylinder design. In three years, Johnson was the largest outboard manufacturer in the business.

Today, Johnson is still the largest. Its use of Alcoa® Aluminum Screw Machine Stock makes interesting reading to any manufacturer wanting to improve his product and make it sell faster.

Few products demand so much from machined parts as outboard motors—lightness, strength and corrosion resistance, too. These three advantages often set aluminum head and shoulders above other materials for screw machine parts. But consider the other advantages of aluminum which may have a more important place in your product. Exceptional machinability—limited almost entirely by machine capacity; high electrical and thermal conductivity: ease of finishing. These performance characteristics of Alcoa Screw Machine Stock, when coupled with the solid economic fact that you get three times as many parts per pound as with heavy metals, make up the total good sense of aluminum.

These are hard, commercial reasons why aluminum more than ever before should be carefully considered for every screw machine part you make or buy. Help in this type of analysis is available from every one of Alcoa's local sales offices listed in your phone book under "Aluminum." Aluminum Company of America, 870-F Alcoa Building, Pittsburgh 19, Pennsylvania.

*Johnson
MOTORS
Waukegan, Illinois



Chief Engineer, S. A. Metcalf (at right);
Ed Stoyonoff, Senior Draftsman (at left).

IN PURCHASING

Purchasing Agent, J. G. Kohler, says—"We have always used Alcoa Aluminum Screw Machine Stock and today we buy 100% of our requirements from Alcoa. We have never had a reject to my knowledge. It is this dependability of service, coupled with Alcoa technical help and Alcoa technical booklets, that keeps Alcoa strongly in our supply picture. Being the world's largest maker of outboard motors, we must schedule our buying closely to production. We know we can depend on Alcoa."

Purchasing Agent, J. G. Kohler.

IN PRODUCTION

Foreman of Automatic Screw Machine department, F. H. Mitchell, says—"We run aluminum at the top capacity of our machines. Tolerances are often as close as two-tenths. Aluminum machines so easily that we often reduce the O. D. of a part with die chasers. We also find that the cutoff finish we get with aluminum is superior to brass and steel. Tool life is fine. Tool preparation for aluminum is easy. We use Alcoa booklets as standard reference material and aluminum gives us no headaches in production. We like it."

Foreman, F. H. Mitchell (at right);
James Hairrell, Machine Operator (at left).

IN DESIGN

Chief Engineer, S. L. Metcalf, says—"Our prime design consideration at Johnson is putting the most power possible in every pound of motor. For this reason we naturally rely on aluminum for over 50 screw machine parts. In addition, we have severe corrosion requirements—another reason for our use of aluminum. The fact that we get three times as many parts per pound with aluminum as with heavy metals also helps us make a better motor at lower cost. Alcoa technical help is always at our disposal. Because we use so much aluminum on our motors, we frequently have threaded aluminum parts mated with other aluminum parts. In these cases, the ease of anodizing aluminum nicely avoids any possible problems of seizure and salt water corrosion."

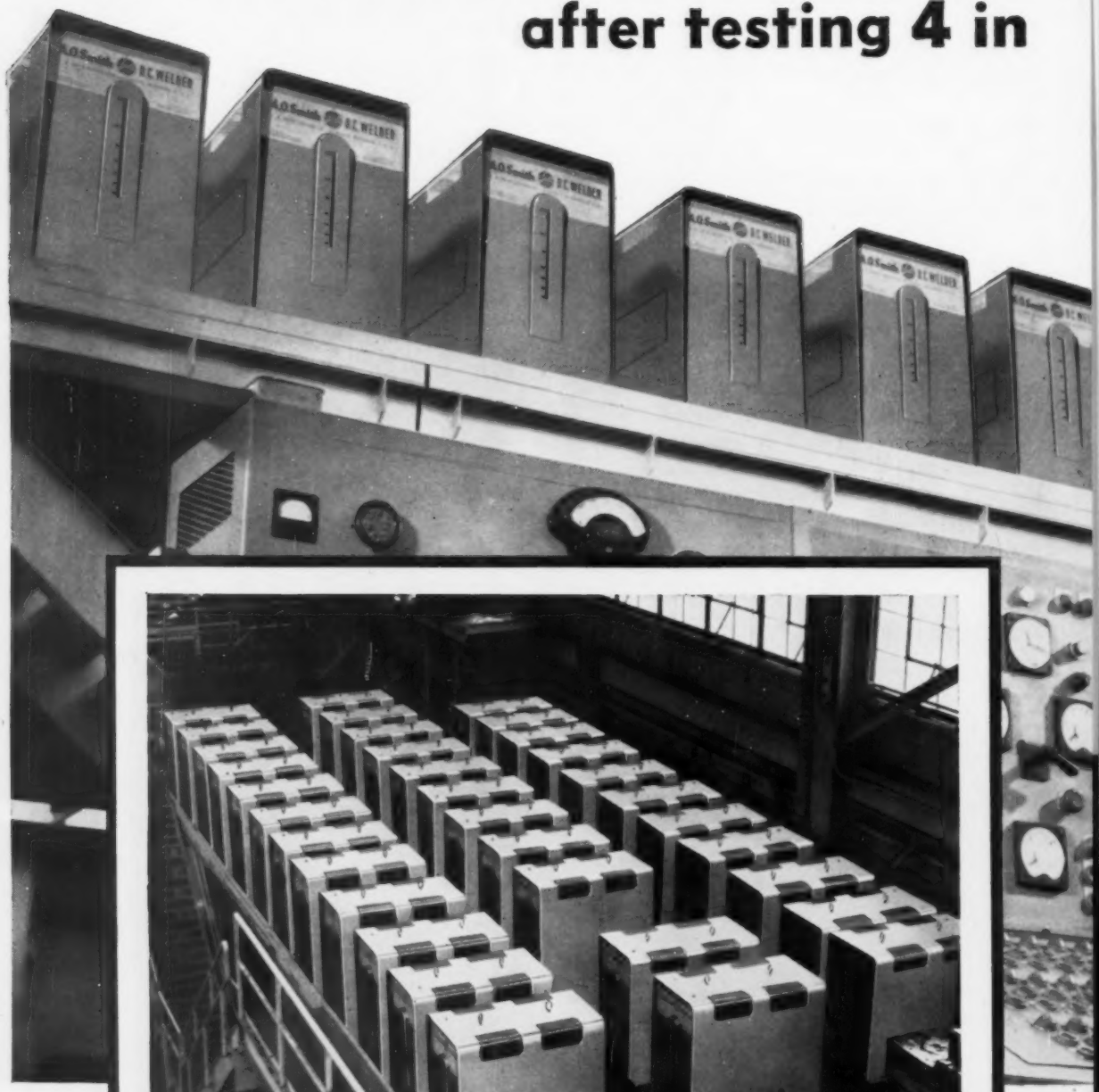
Typical parts made of Alcoa Aluminum
Screw Machine Stock by Johnson Motors.

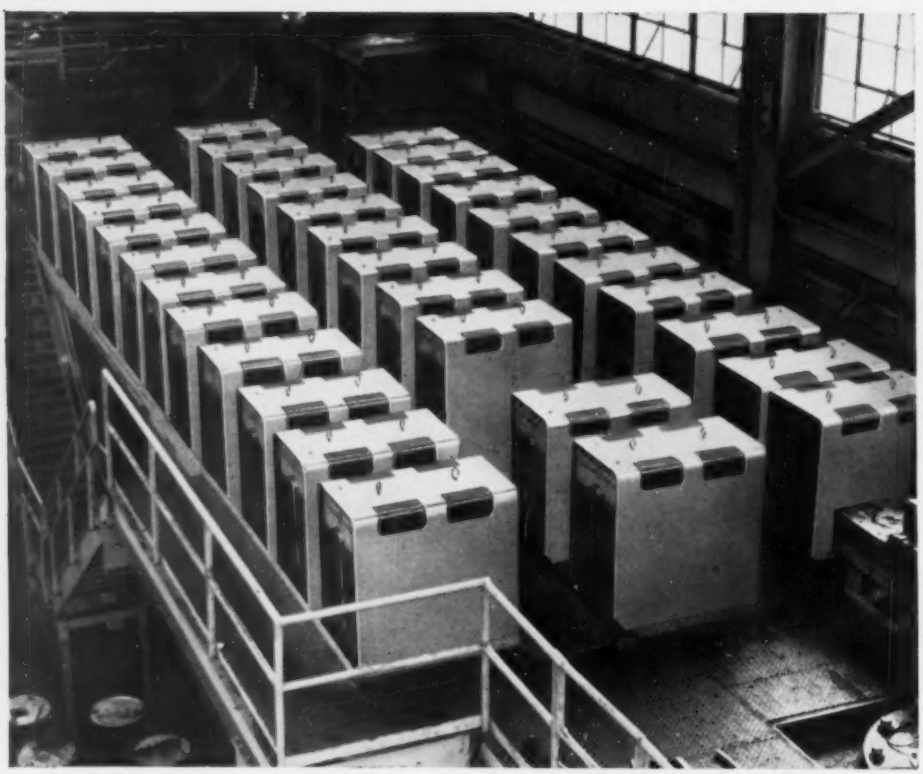
THE ALCOA HOUR
TELEVISION'S FINEST LIVE DRAMA
ALTERNATE SUNDAY EVENINGS

Your Guide to the Best in Aluminum Value

ALCOA ALUMINUM
SCREW MACHINE STOCK
ALUMINUM COMPANY OF AMERICA
ALCOA

Titanium producer converts after testing 4 in





A. O. Smith d-c rectifiers located above furnaces are extremely compact, clean in design — require only a fraction of the floor-space that would be used by d-c generators. High-velocity ventilation draws cool air over stacks before blasting it through machine . . . keeps temperatures below critical stage even when units are short-circuited at full-rated amperage.

to A. O. Smith d-c rectifiers

trial by torture!

Mallory-Sharon Titanium Corporation replaced d-c generators with multiple batteries of compact, space-saving A. O. Smith 1000-amp d-c rectifiers. Move resulted from tests which included frequent 'round-the-clock operation . . . sustained short circuits of 20 to 30 seconds duration at currents 88 to 100% above rating.

Rectifiers are remote controlled from central panel. Amperage control is stepless, effortless over full range. In 16 months' operation, despite rugged production schedules, Mallory-Sharon reports performance has been "entirely satisfactory." Rectifiers have no moving parts, are simple to maintain and service.

TO provide a better power source for its titanium double-melting furnaces at Niles, Ohio, Mallory-Sharon installed four A. O. Smith 1000-amp d-c rectifiers on a trial basis. The tests proved them simpler to install, lower in cost per ampere, quieter, more dependable and efficient than d-c generators. Findings were so conclusive that A. O. Smith rectifiers were ordered to replace all rotating machinery.

If you're searching for an a-c or d-c power source for welding, arc furnaces, plating, gas generation or jobs similar to Mallory-Sharon's, A. O. Smith can supply a practical, economical answer. Get the facts on how our dependable standard a-c and d-c units can be easily, inexpensively applied to your operations. See, too, how A. O. Smith's unrivalled experience in the field can save you engineering, and application expense.

Contact your "man from A. O. Smith" or write direct.

The man from A. O. Smith, in this application, is Myron A. Ockerman. He not only assisted Mallory-Sharon engineers in selection and installation of rectifiers; he also worked closely with them in choice of A. O. Smith 600-amp welders for welding titanium ingots together to form progressively larger ingots.

Through research ... *a better way*

A.O.Smith

CORPORATION

WELDING PRODUCTS DIVISION

Milwaukee 1, Wisconsin

International Division: Milwaukee 1, Wisconsin

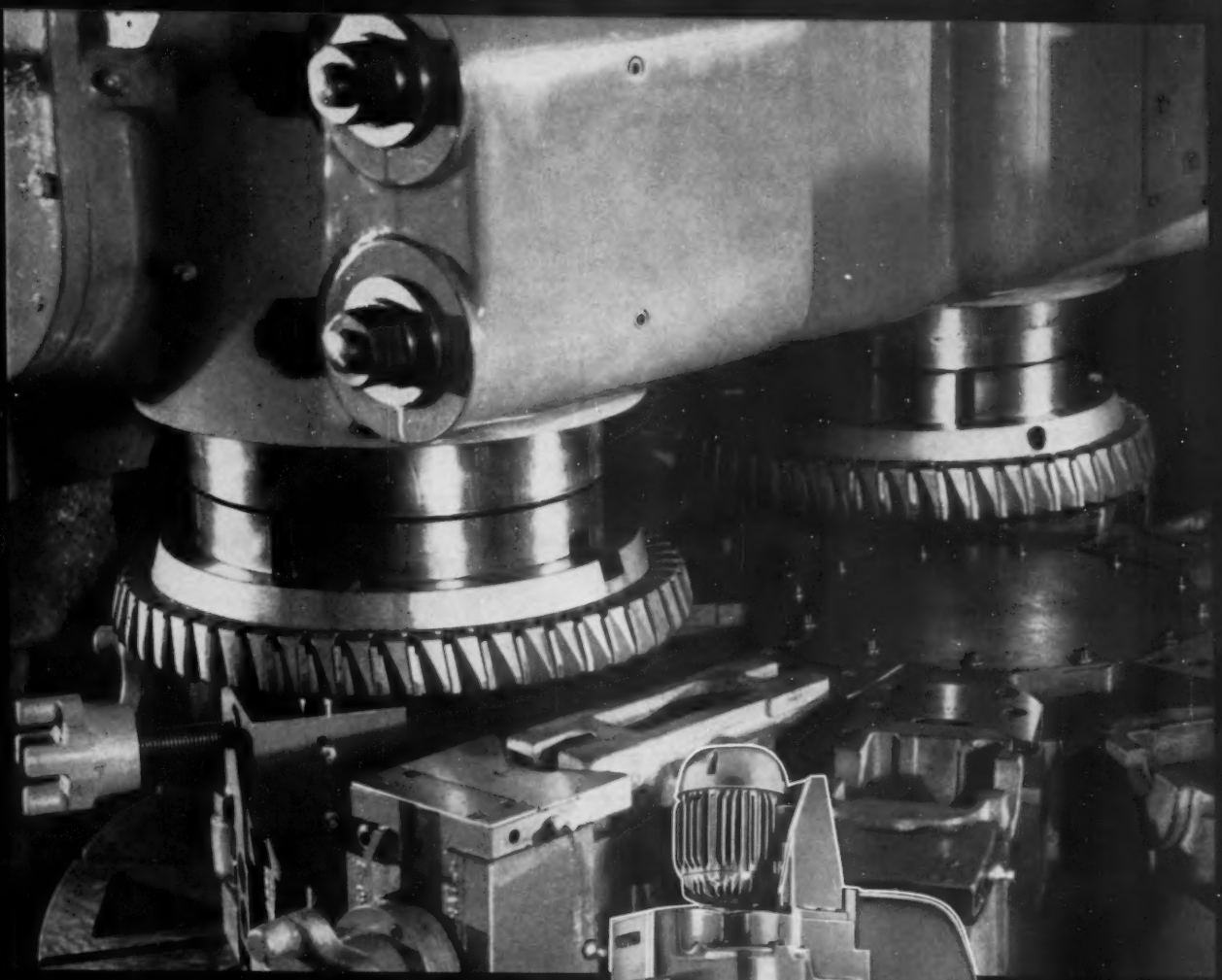
A Method . .

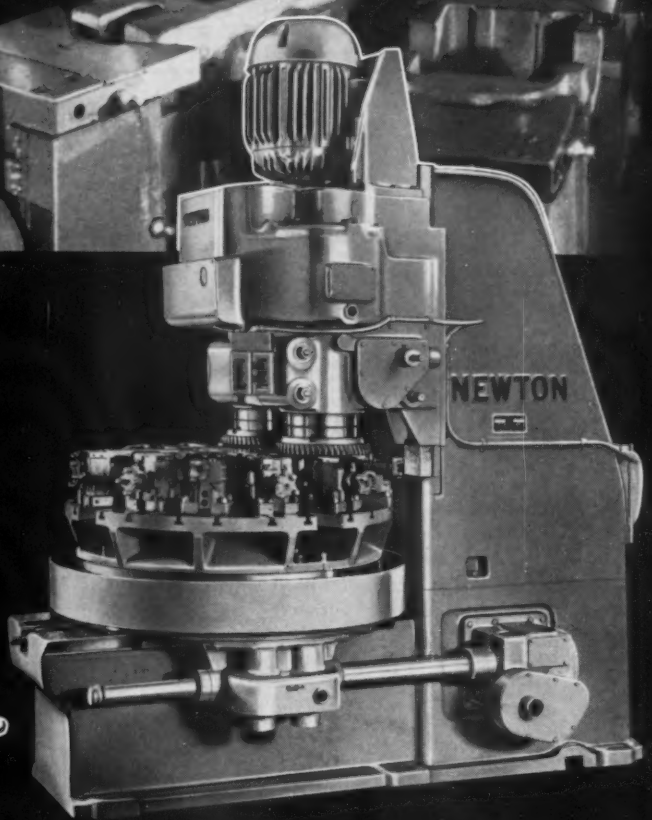
A Newton Vertical Rotary is more than a machine tool—it is a method—the *fastest known method* of milling the flat surfaces of repetitive pieces.

It is fastest because these machines mill continuously!

CONSOLIDATED MACHINE

A DIVISION OF FARREL-

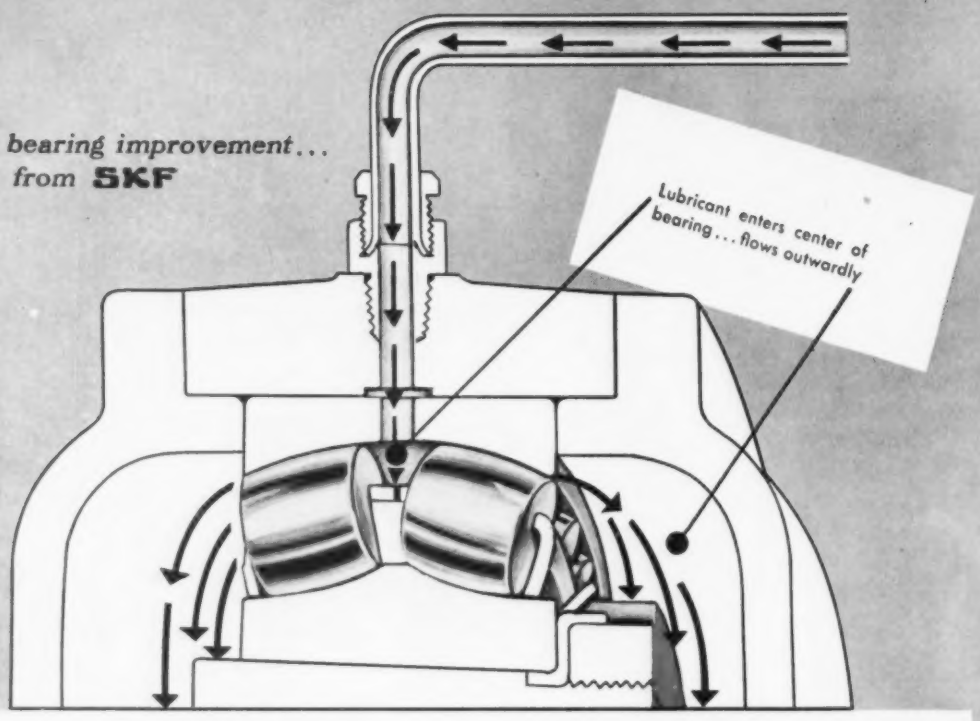




TOOL COMPANY ROCHESTER 10, NEW YORK

BIRMINGHAM CO., INC.

Another bearing improvement... from **SKF**



NOW AT NO EXTRA CHARGE-

SKF's improved method of lubricating large spherical roller bearings

To make the lubricant effective it should be located where needed—in the bearing. Also, new lubricant, when added, should enter where it does the most good—in the bearing.

For these reasons, all future production of SKF double row spherical roller bearings above 240 mm O.D. (9.4488") will be made with three equally spaced drilled holes in the center of the outer ring without any extra charge to our customers. *This permits the lubricant to enter the center of the bearing.*

With the lubricant (either grease or oil) being introduced into the center of the bearing, all working surfaces are quickly and completely covered. In addition, the outward flow flushes out the old lubricant, and with it, any abrasive dust, dirt, moisture or other impurities.

And where circulating oil lubrication is required, there is a continuous flushing and cooling of the bearing.

This is another example of how SKF helps you to obtain longer bearing life.

7711

Consult your SKF District Office today for complete information so that you can be the first to incorporate into your products this improved method of lubricating large spherical roller bearings.

SKF®

BALL AND ROLLER BEARINGS

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

—manufacturers of **SKF** *and* HESS-BRIGHT® *bearings.*

Ship fast

UNITED'S radar-equipped DC-6A Cargoliners® are the world's fastest commercial cargo planes!

UNITED alone links all the major markets in the East, Midwest, *all* the Pacific Coast (and Hawaii)!

Ship sure

UNITED specializes in scientific handling. One example: recessed-wheel pallets to speed loading!

UNITED provides extra care in moving heavy pieces—the DC-6A's Motorized Tug Bar does it!

Ship United

UNITED guarantees you space dependability through its centralized Customer Service system!

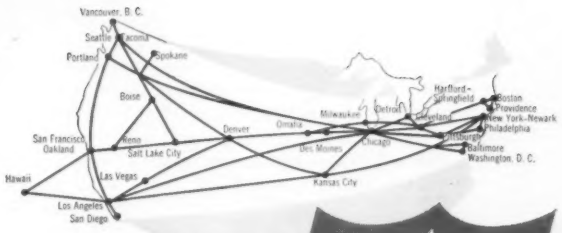
UNITED also offers reserved Air Freight space on *all* equipment—and Telemeter Airbill service!

Examples of United's low Air Freight rates

*per 100 pounds**

CHICAGO to CLEVELAND	$4.78
NEW YORK to DETROIT	$5.90
DENVER to OMAHA	$6.42
SEATTLE to LOS ANGELES	$9.80
PHILADELPHIA to PORTLAND	$24.15
SAN FRANCISCO to BOSTON	$27.00

*These are the rates for most commodities. They are often lower for larger shipments. Rates shown are for information only, are subject to change, and do not include the 3% federal tax on domestic shipments.



UNITED AIR LINES

For service or information, call the nearest United Air Lines Representative. Write for free Air Freight booklet, Cargo Sales Division, Dept. IA-6, United Air Lines, 5959 S. Cicero Ave., Chicago 38.

Now available... new hollow aluminum bar stock

Harvey Aluminum hollow bar stock is now available for a wide variety of hollow-part machining jobs. The new bar stock offers material savings, speeds production, and drastically cuts chip handling and scrap waste. Made of a special Harvey aluminum alloy, the new bar provides exceptionally high yield strength and corrosion resistance, has excellent machinability and surface finish. For *most* applications, the cost of hollow aluminum bar is 20% to 30% *lower* than conventional solid bar . . . . because the hole is already there!

It will pay you to immediately investigate the wide range of sizes available. Write or call today to have your Harvey field engineer show you how to save time and money with the new hollow aluminum bar stock. *Harvey Aluminum, Torrance, Calif. Branch offices in principal cities.*

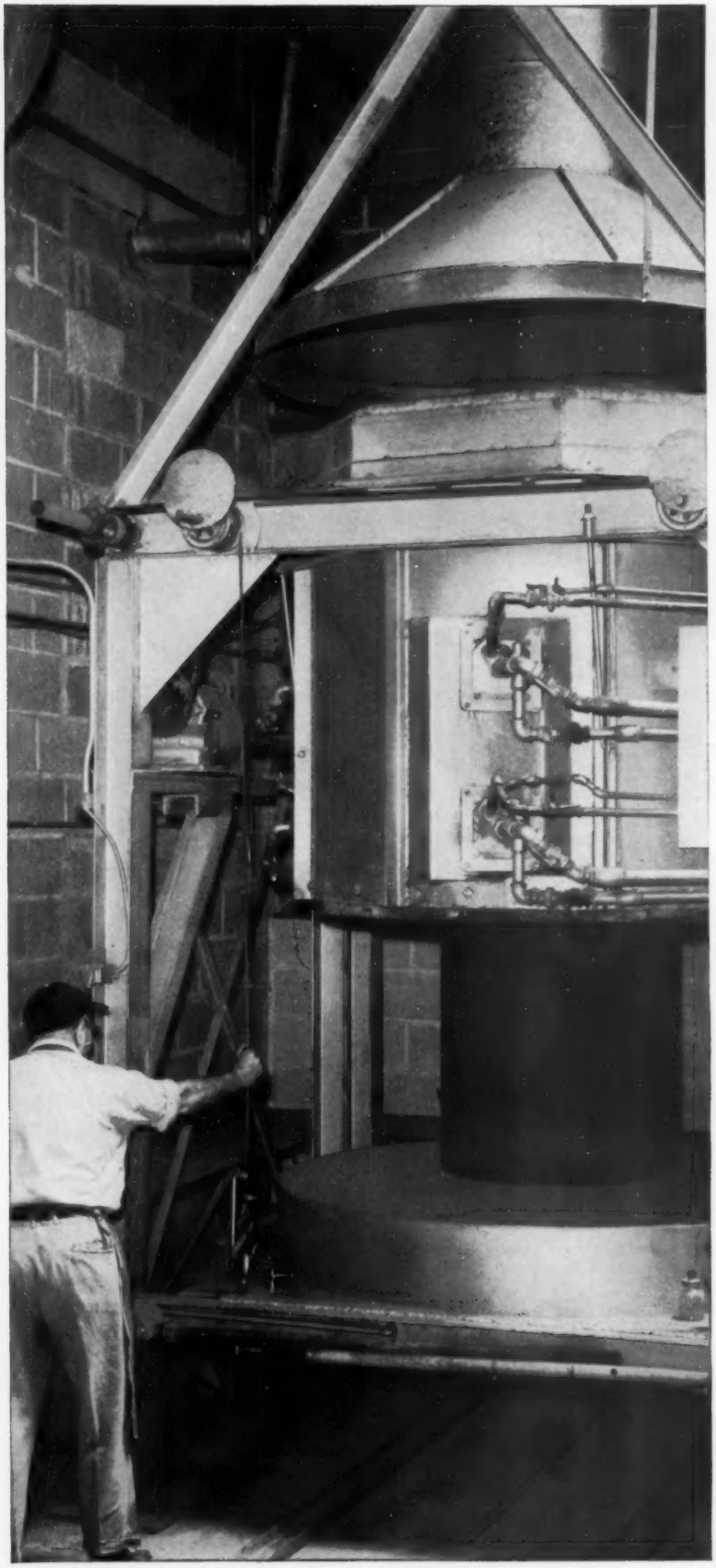
Harvey is a leading independent producer of quality aluminum products. Extrusions in all alloys and in all sizes, special shapes, press forgings, hollow sections, structurals, rod and bar, forging stock, pipe, tube, impact extrusions, aluminum screw machine products and related products. Harvey is also producing similar items in titanium and steel.

Making the most of aluminum...

for everyone

HARVEY Aluminum

HARVEY ALUMINUM SALES, INC., TORRANCE, CALIFORNIA • BRANCH OFFICES IN PRINCIPAL CITIES



"We get fast, easily controlled heat... thanks to GAS"

—Teiner Engineering Corp.
Malden, Mass.

Only Gas-fired equipment can supply proper heat processing for the important operations of metal melting, shell molding and hydrogen stress annealing at the Teiner Engineering Corporation, supplier to many of the nation's foremost electronic firms.

C. R. Hood, at Teiner, explains, "Gas is dependable, accurately controllable, and highly satisfactory for our most important operations. What's more . . . Gas is fast, clean and easily handled."

Speed, cleanliness, and the many other advantages of Gas, can be yours, too. For information on how Gas can help you in your production operations, call your Gas Company's industrial specialist. He'll be glad to discuss with you the economies and results you get with Gas and modern Gas-fired industrial equipment. *American Gas Association.*

This special Gas-fired furnace makes easy work of the hydrogen stress annealing essential to high fidelity operation of electronic circuits.

Many Users Say This Belt Outlasts Them All

The Ray-Man Conveyor Belt features a new and different construction of covers and strength member to resist cuts, tears and abrasion to a degree never before attained. R/M's exclusive "XDC" Cover provides a degree of protection and long life not possible with any other belt. Inside this cover, Ray-Man Conveyor Belt combines elastic cushioned strength member plies in an envelope of strong, yet flexible synthetic fabric to resist gouging and tearing ... to take the impact of large, abrasive lumps... to permit the belt to trough easily and train naturally.

Like all Manhattan heavy duty conveyor belts, Ray-Man is moisture resistant and mildew-proof. It requires no breaker strip and holds fasteners considerably better than other types of belts. Let an R/M representative show you the advantages of Ray-Man as well as other R/M conveyor belts, including Homocord, with its extra cushion for unusually abusive shock loading. He'll help you select the belt best suited for your job . . . one designed to give you "More Use per Dollar." Write for Bulletins 6906 and 6915.

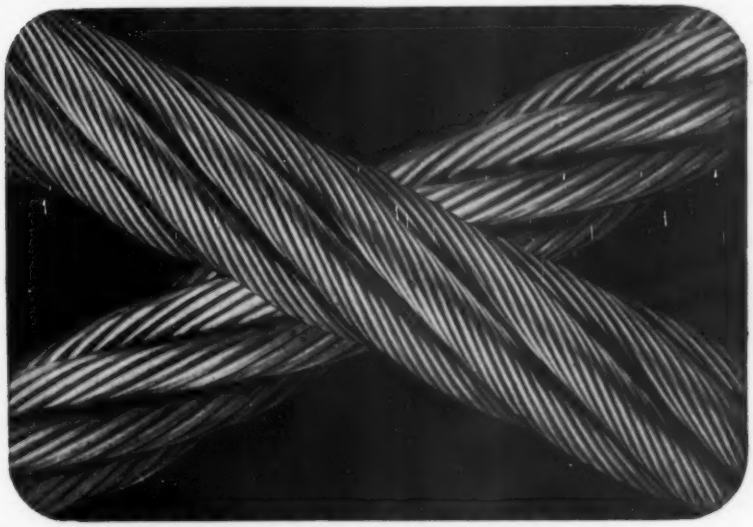
RM 4500 P

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Laundry Pads and Covers • Bowling Balls

FIRST WE DEVELOPED 1105 ROPE WIRE.



THEN WE MADE ROEBLING'S

Royal Blue

WIRE 1105 ROPE

1105 takes Royal Blue out of the ordinary wire rope class.

1105 is a rope wire that's new—that's stronger. It's the biggest news in many years.

1105 is the result of more than a century of research and development—it's the wire that gives Roebling Royal Blue the stamina that pays off in service.

Contact your Roebling distributor or write us for the full story.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4501 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 331 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6, N. Y.

The No. 1 ROUTE

...To Spring Satisfaction passes near you...

A unique springmaking service . . .
making available to bustling industrial areas a vast pool of integrated skill and research—through separate, complete operating Divisions.
Factory-trained sales and engineering field men.
Design literature available on all types of springs.

DIVISIONS OF ASSOCIATED SPRING CORPORATION — COAST TO COAST

WALLACE BARNES COMPANY — BRISTOL, CONNECTICUT

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RAYMOND Manufacturing COMPANY — CORRY, PENNSYLVANIA

BARNES-GIBSON-RAYMOND — 40300 PLYMOUTH RD. PLYMOUTH, MICH.

B-G-R COOK PLANT — ANN ARBOR MICHIGAN

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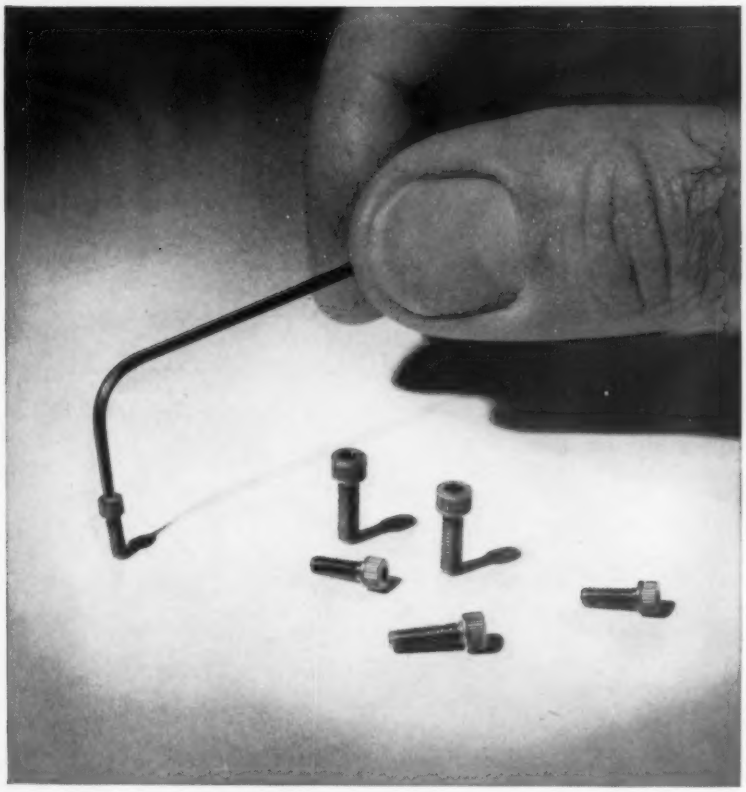
Divisions of
ASSOCIATED SPRING CORPORATION

Miniature screws aid standardization of small devices



Standard UNBRAKO miniature socket head cap screws are available in sizes # 0, # 1, # 2 and # 3, in heat treated alloy steel or stainless steel, at your authorized industrial distributor's. Standard lengths range from ⅛ to ½ in.

Tiny close-tolerance Unbrako screws available in standard sizes

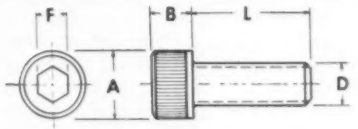
New economies in the design of space-saving miniature equipment are possible with these UNBRAKO miniature socket head cap screws. Manufactured to timepiece precision, available locally, they save the costly necessity of designing special screws to fasten tiny parts in compact units. They're ideal for use in typewriters, calculators and computers, servomechanisms, electric and electronic equipment—and in countless other small, intricate devices where maximum reduction in bulk and weight is required with no sacrifice in strength of individual components or assemblies.

Fingers grip the knurled heads on these tiny screws positively for easy handling and fast assembly. Uniform hex sockets assure maximum wrenching torque. Controlled fillets under the heads prevent shearing of the heads. Threads are fully formed for maximum strength and exact fit. Extremely accurate head diameters permit their use in countersunk holes, saving weight by reducing the length of the screw required and making flush designs possible.

These standard UNBRAKO miniature screws are available at your authorized industrial distributor's. See him today. Or write us for Bulletin 2055 and samples. Unbrako Socket Screw Division, STANDARD PRESSED STEEL Co., Jenkintown 17, Pa.

HEAT-TREATED ALLOY STEEL

Class 3 Fit Standard



	Diameter	Threads per Inch NC	Threads per Inch NF	Length	Recommended Installation Torque in Inch-Pounds NC	Recommended Installation Torque in Inch-Pounds NF	Weight per 1000 in Pounds
#0	A .104		80	⅛		2.0	.152
	B .060		80	3/16		2.0	.182
	D .060		80	¼		2.0	.210
	F .050		80	⅜		2.0	.265
#1	A .118		72	⅛		3.5	.27
	B .073		72	3/16		3.5	.32
	D .073		72	¼		3.5	.37
	F .050		72	⅜		3.5	.47
#2	A .140	56		3/16	6.0		.42
	B .086	56		¼	6.0		.50
	D .086	56		⅜	6.0		.58
	F 1/16	56		½	6.0		.70
#3	A .161	48		3/16	8.5		.59
	B .099	48		¼	8.5		.70
	D .099	48		⅜	8.5		.81
	F 5/64	48		½	8.5		1.03

Standard Screws are threaded to the head. Special materials, lengths, and threaded lengths are available. One "High-Titan" UNBRAKO hex key is included with each package of 100 screws.

UNBRAKO®

SOCKET SCREW DIVISION

STANDARD PRESSED STEEL CO.

SPS

JENKINTOWN PENNSYLVANIA

IN ELECTRIC-WELD PIPE AND TUBE MAKING

Yoder leads the way

to higher speeds and quality at lower cost

In the short period from 1938 to 1955, the production of electric welded pipe and tubing grew from 269,000 tons to over 3,000,000 tons. This phenomenal rate of growth—over two and one-half times faster than that of the pipe and tube making industry as a whole—to a large extent resulted from a series of important improvements in tube mill design, all introduced by Yoder.

First came the Yoder rotating welding transformer, in 1938. The economic and other benefits conferred by this epoch making innovation were further augmented by other technological advances scored by Yoder in the years that followed. The result was that electric-weld pipe and tube making became the child prodigy of the fast growing pipe and tube making industry.

Latest, and perhaps the greatest, of these developments is the cold forming and induction welding at high speeds of *aluminum, magnesium, brass, nickel, monel, and other non-ferrous metals and alloys.* This process is especially economical for making light and medium gauge tubes in sizes up to 8 in. dia. More and more leading non-ferrous metal producers and fabricators are installing these mills.

More complete information about this and other interesting Yoder developments in pipe and tube mill equipment may be had merely by asking for any of the following publications:

- ☐ Resistance-Weld Mills for making Steel Tubing up to 4" diameter.
- ☐ Induction-Weld Mills for making Non-ferrous Tubing.
- ☐ Resistance-Weld Mills for Steel Pipe up to 24" diameter.

THE YODER COMPANY

5510 Walworth Avenue Cleveland 2, Ohio

ENGINEERING YODER MANUFACTURING

PIPE AND TUBE MILLS—Electric Weld

ROTARY SLITTING LINES

COLD ROLL FORMING MACHINES

BIRDSBORO creative engineering solves tough mill problems

DESIGNERS AND BUILDERS OF:

- STEEL MILL MACHINERY
- HYDRAULIC PRESSES *(Metalworking and Extrusion)*
- CRUSHING MACHINERY
- SPECIAL MACHINERY
- STEEL CASTINGS
- Weldments "CAST-WELD" Design
- ROLLS: Steel, Alloy Iron, Alloy Steel

If your new mill is still in the idea stage . . . If you have been thinking about modifying your present mill . . . If you have a production problem that can be solved by extensive experience and engineering ability . . .

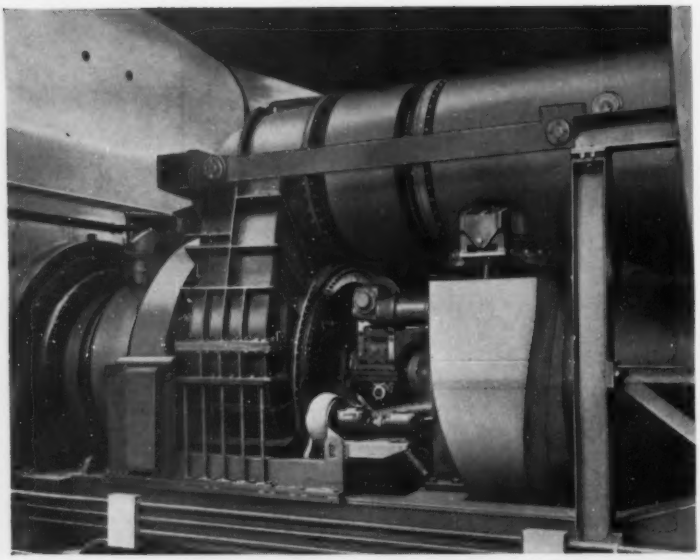
Call in a Birdsboro representative to discuss your plans. In addition to his own knowledge, he has the entire Birdsboro staff on call and will gladly start the machinery that will put them to work on your job. In nearly every case, there are better ways to do it . . . and Birdsboro either already knows them or will help to find them for you.

RM-51-56

BIRDSBORO

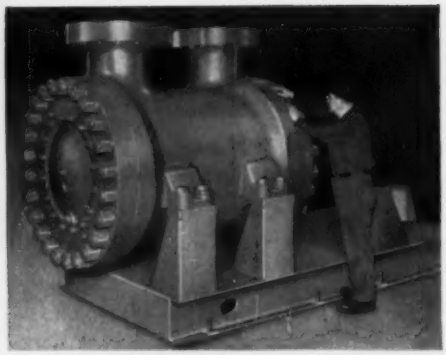
BIRDSBORO STEEL FOUNDRY & MACHINE CO., Main Offices in Birdsboro, Pa. District Office: Pittsburgh, Pa.

New York Office: **Engineering Supervision Co.,** *120 West 42nd Street, New York 36, N.Y.*

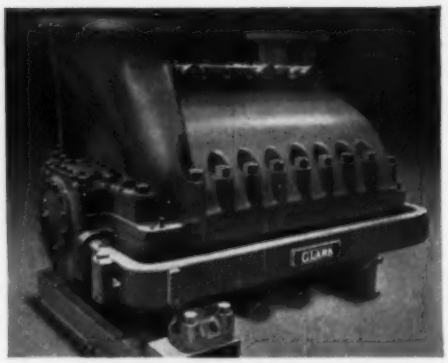


Clark 8500 BHP Gas Turbine for centrifugal compressor, generator or pump drive.

Clark Barrel Type Centrifugal Compressors for extremely high pressures.



Clark Multi-Stage Centrifugal Compressors designed for process applications.



Clark Centrifugal Pipeline Booster for low ratios and high pressures.

GAS TURBINES + CENTRIFUGAL COMPRESSORS

Only CLARK builds both!

Now you can get centrifugal compressors and modern gas turbines to drive them *exclusively* from one manufacturer . . . Clark.

In addition to saving money and headaches, you'll get proved, matched-performance "packages" specifically designed for continuous trouble free service.

Whether you have a million or a billion cubic feet of air or gas per day to handle at pressures of up to 4500 pounds per square inch, there is a Clark centrifugal compressor and in most cases a matching Clark gas turbine to drive it.

Your nearest Clark representative will be pleased to give you all the facts.

CLARK BROS. CO., OLEAN, N. Y.

One of the Dresser Industries

Offices in Principal Cities throughout the World

CLARK®

GAS TURBINES
CENTRIFUGAL COMPRESSORS

Remarkably quick, easy assembly and welding of the five .209" gage formed parts that comprise a modern compressor housing is possible because each part is precision formed to extremely exacting dimensions. Additional machining is not necessary. Each part is finished, ready for final assembly, as it comes off By-Products' new high speed press line.

Now—fast stamping to close tolerances!

WHAT CAN OUR NEW PRESS LINE DO FOR YOU?

■ By-Products Steel Co.'s modern new high speed press line adds light gage pressing equipment to its already extensive heavy plate shaping facilities. The line will satisfy manufacturers who need precision formed parts from 16-gage material well into heavier plate thicknesses. And dependability is assured by the combination of the very latest equipment and skilled craftsmanship.

We've made the investment in equipment and manpower. You pick up the benefits in lower overhead...fewer production steps in your shop... reduced freight costs...virtually no scrap loss...lower production costs.

Get the facts! Write, outlining your interests, to Manager, Marketing Service, 831 Lukens Building, Coatesville, Pennsylvania.

■ PRESS LINE UNITS

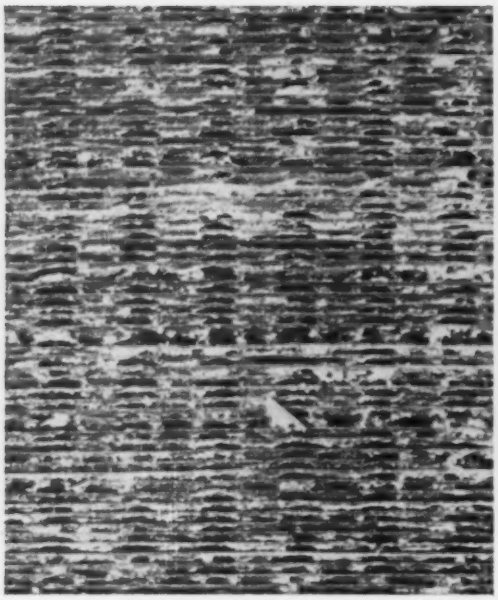
1. 900 Ton Hydraulic Press
2. 600 Ton Mechanical Press
3. 150 Ton Punching Press
4. 45 Ton Punching Press
5. 22 Ton Punching Press
6. Trimming Press
7. Annealing Furnace
8. Washing Machine
9. Automatic Loader and Greaser

Units are linked by reversible conveyors for fast, economical production.

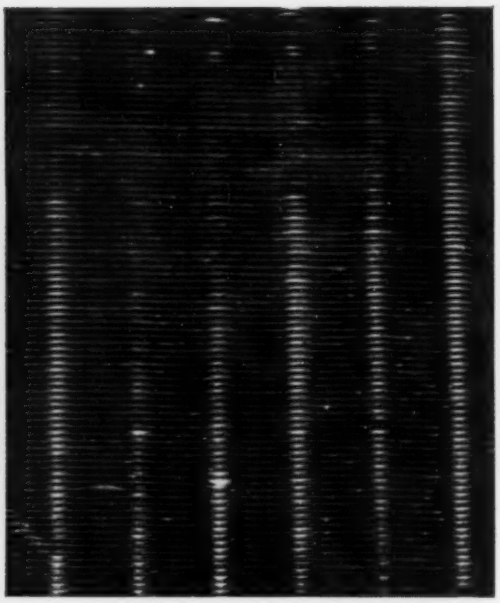
BY-PRODUCTS STEEL CO. LUKENS

A DIVISION OF LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

1150-hour salt spray test shows increased corrosion resistance with Bonderite on aluminum



UNTREATED. *Unretouched photo of section of aluminum refrigeration air conditioner condenser after 1150 hours in salt spray. Note corrosion.*



BONDERITE-TREATED. *Unretouched photo of identical aluminum refrigeration air conditioner condenser after 1150 hours in salt spray. Note absence of corrosion.*

If you want more effective bare corrosion resistance or increased durability for paint, treat aluminum and its alloys with Bonderite.

Special formula Bonderites have been developed and tested and proven thoroughly for this purpose. They form a thin, iridescent, remarkably effective integral coating with the aluminum in simple and economical operation. Solutions are sludgeless, easily controlled, and produce results of uniform high quality.

The Bonderite coating is flexible, withstanding moderate draws without trouble. The coating conducts electricity, necessitating no change in arc and spot welding procedures. Bimetallic and galvanic corrosion resistance is high.

Applications are many and varied. Aircraft, automotive, air conditioning, refrigeration and strip stock fabrication are a few of the industries which are finding it extremely useful. 700 Series Bonderites meet the requirements of MIL-C-5541.

Get complete information on this more effective protection for aluminum and its alloys. Write for bulletin on Bonderite 710 and 720.

**Bonderite, Bonderlube, Parco, ParcoLubrite—Reg. U.S. Pat. Off.*

Since 1914—leader in the field

PARKER RUST PROOF COMPANY
2186 E. MILWAUKEE, DETROIT 11, MICHIGAN

BONDERITE	BONDERITE and BONDERLUBE	PARCO COMPOUND	PARCO LUBRITE	TROPICAL
corrosion resistant paint base	aids in cold forming of metals	rust resistant	wear resistant for friction surfaces	heavy duty maintenance paints since 1883

HOW FAR CAN YOU GO

in multiplying service life of critical parts?

Tips were breaking off these fuel injector nozzles for diesel engines within one to 30 days after installation. Result: costly damage to the engines. The nozzle manufacturer was on the spot. He needed a tougher steel . . . and one with greater hardening accuracy because the holes in the nozzle had to be held extremely small.

At this point the company called in Carpenter . . . and a Carpenter-engineered specialty steel was matched to the job. Service life of the nozzles promptly increased from 30 days to an average of two years. And shop fabricating problems literally disappeared.

Every week, more companies like yours are discovering just how far they can go in increasing service life of critical parts . . . reducing fabricating headaches . . . improving product salability. Here's one reason why: Carpenter quality and pioneering ability are backed by one of the largest staffs of skilled metallurgists, per pound of steel produced, in the industry.

Can you honestly afford to remain "satisfied" when this road to improvement lies wide open? Start by sending for a copy of "A Guide to Specialty Steels as Made by Carpenter." *The Carpenter Steel Co., 121 W. Bern St., Reading, Pa.*

Are you taking advantage of these specially-engineered steels as made by Carpenter?

Matched Tool and Die Steels / Stainless Steels / Special Purpose Alloy Steels / Silicon and High Nickel Alloys / Valve, Heat-Resisting and Super Alloy Steels / Tubing and Pipe / Fine Wire Specialties

Carpenter STEEL

for product improvement

NOW! from the world's largest horizontal steel extrusion press...

SEAMLESS

HEAVY WALL PIPE

from any ferrous alloy

Now heavy wall pipe can be extruded from any ferrous alloy – in lengths up to 50 feet or more, with O.D.'s from 4″ to 22″, and with virtually no restriction on wall thickness.

The giant Curtiss-Wright horizontal extrusion press, now operating at the Metals Processing Division, *moves* the metal instead of *removing* it, for pipe of maximum length – and strength.

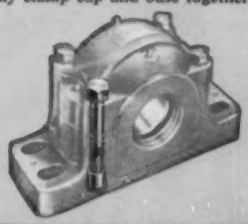
If your application calls for higher heat, corrosion and/or abrasion resistance – in pipe of highest tensile and yield strengths – Metals Processing Division is geared to fill the requirement. Complete facilities for handling any ferrous alloy, including the stainless series, as well as titanium and other reactive metals, are available to the chemical, petroleum, power and other key industries.

Take advantage of this new, aggressive facility for your pipe requirements. Write, wire or telephone for detailed information or engineering consultation today. Our field engineers are at your service.

METALS PROCESSING DIVISION
CURTISS-WRIGHT
CORPORATION • BUFFALO, NEW YORK

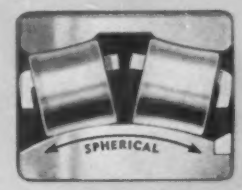
MORE FACTS on why more and more leading manufacturers choose Link-Belt bearings

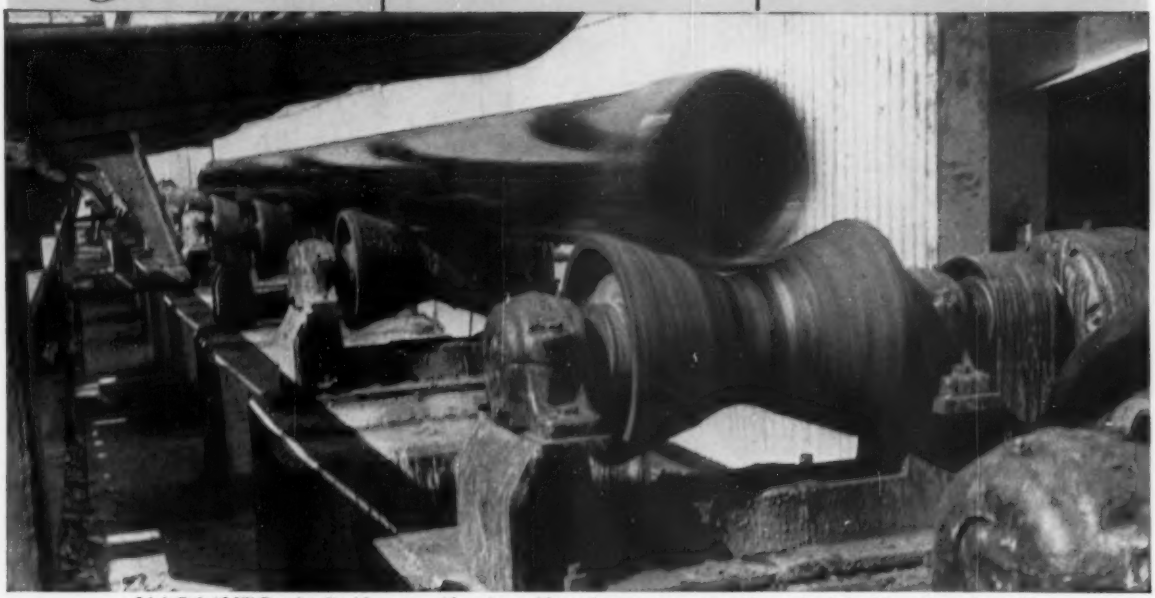
SUPER-RUGGED CAST STEEL HOUSING. Proper positioning of cap on base is assured by large-size dowels. Four heat-treated thru-bolts and serrated steel nuts firmly clamp cap and base together.



CHOICE OF SEALS. Spiral labyrinth steel seals, left, are for oil or grease lubrication and heat conditions. Combination felt and synthetic rubber contact-type seals, right, for grease lubrication.

SELF-ALIGNING ROLLER BEARING is self-contained and adjusted at the factory—needs no shims or alignment rings at installation. Design assures free rolling under even the toughest conditions.





Link-Belt "Mill Bearings" with cast steel housings withstand severe impacts and heavy loads in this modern pipe mill.

"Mill Bearings" with cast steel housings

designed by Link-Belt to take industry's heaviest loads and hardest impacts

"Mill Bearings" are now available for shafts up to 11 in.

● To stand up to the sudden shocks and impact loads met in steel mills, mines, foundries, oil field applications and on heavy equipment, Link-Belt has designed the extra tough "Mill Bearing." It's the precision Link-Belt self-aligning roller bearing mounted and protected in a durable cast steel housing.

Thoroughly-proved Link-Belt "Mill Bearings" maintain full load capacity even with shaft deflections and misalignment often existing in extremely heavy service. And their simple, efficient design assures long life and free rolling.

Link-Belt makes industry's most complete line of ball and roller bearing blocks. So whatever you need, you'll find the answer in this quality line. Ask any of the 40 Link-Belt offices or an authorized stock-carrying distributor for Data Book 2550 and Book 2565A on "Mill Bearings."

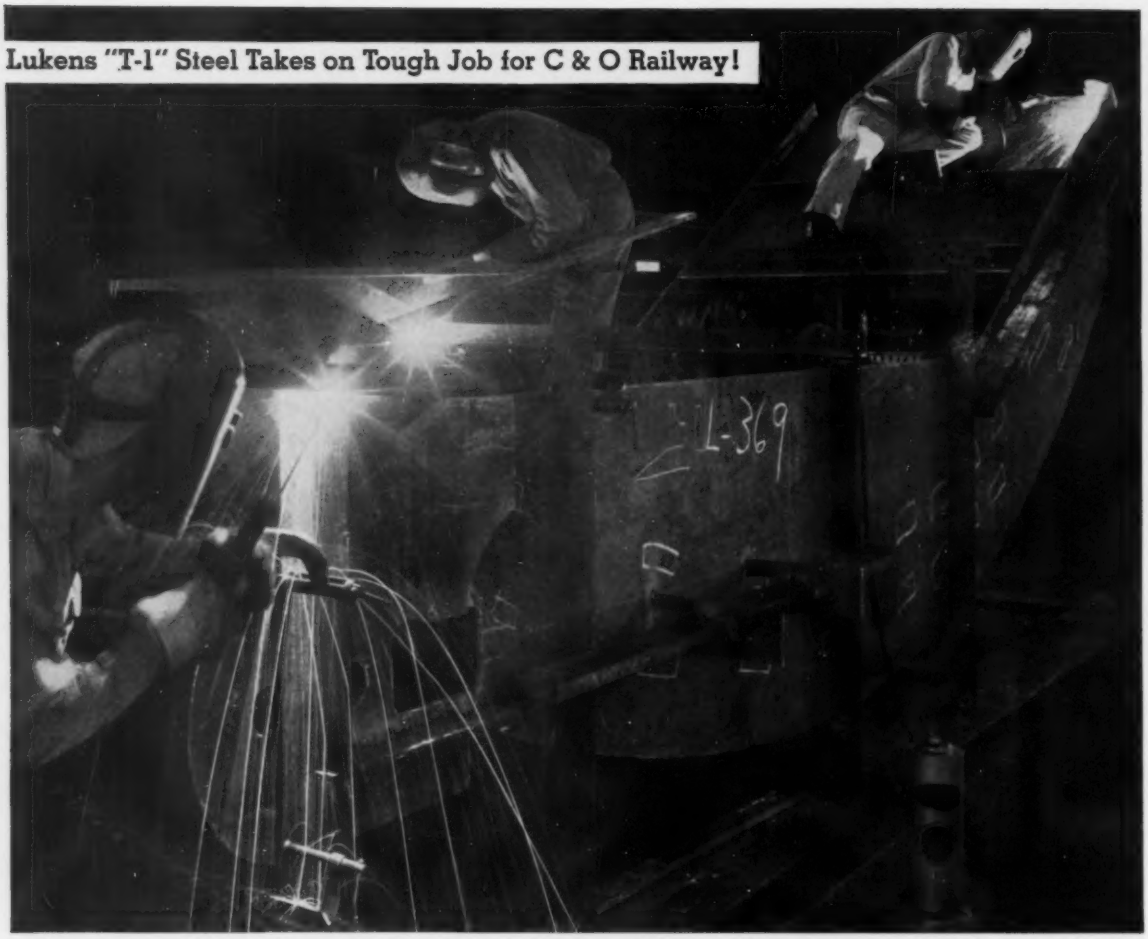
TB 3922

LINK-BELT

Ball and Roller Bearings

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

Lukens "T-1" Steel Takes on Tough Job for C & O Railway!



Horne Brothers of Newport News, first-line fabricators to the shipping industry, are building several new, improved coal trimming machines for the C & O Railway. Lukens "T-1" steel was specified to cut weight, combine strength and abrasion resistance. A number of other Horne Brothers' projects of Lukens "T-1" steel are already in the works.

Fabricator of unique new coal loader says:

"NEVER WORKED WITH AS TOUGH AND STRONG A STEEL THAT'S SO EASY TO WELD!"

■ *Enthusiastic* is the word for Horne Brothers' reports on Lukens "T-1" steel. They call it the best steel yet to combine strength and toughness, impact and abrasion resistance, and the all-important feature of excellent weldability.

Lukens "T-1" steel is economical, too. On this coal loading machine, for example, Horne Brothers was able to effect a 25% reduction in overall plate thickness—a direct result of this new steel's great strength. The finished machine will weigh far less than previous trimmers, operate with greater efficiency, less maintenance and increased life expectancy.

No wonder Horne Brothers is so well satisfied. No wonder they are planning to build more equipment of Lukens "T-1" steel—*right away!*

If your problem is equipment weight... abrasion, impact or atmospheric corrosion... the need for toughness at temperature extremes ... it will pay you to investigate this amazing new alloy steel now.

For the latest in fabrication techniques and specifications, write to **Manager, Marketing Service, 847** Lukens Building, Lukens Steel Company, Coatesville, Pennsylvania.

LUKENS "T-1" STEEL

LUKENS

THE NEWEST IN A COMPLETE LINE OF ALLOY STEELS
LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

DEPENDABLE

Quality

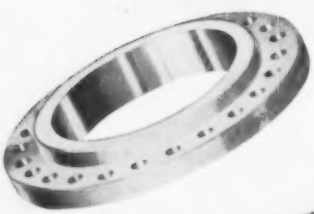
We figure there's nothing that foundries appreciate more, in abrasives, than uniformly high quality. So, that's what we shoot for in the production of SUPER-ANNEALSHOT. You'll find it a malleable shot of thoroughly dependable quality—the finest you've ever used. And, you'll also appreciate its low cost. Efficient mass-production permits our selling this outstanding abrasive at very reasonable prices. If you haven't yet tried SUPER-ANNEALSHOT—you should!

METAL BLAST, INC.

872 EAST 67th STREET • CLEVELAND 3, OHIO

PRODUCING THE FINEST CHILLED AND MALLEABLE SHOT AND GRIT ON THE MARKET

ALCO FLANGES...



Craftsmanship in steelmaking, forging and machining assures quality in the ALCO flange.

The ALCO flange is produced of high-quality carbon or alloy steel, made in ALCO's own furnaces. Steel production by the flange manufacturer lowers your welding, preheat and postheat costs because exact metallurgy is assured.

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Finish and tolerances on the ALCO flange are provided by skilled machinists. You get flanges that fit right, work right in the job you assign to them.

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Contact your nearest ALCO Sales Office or write P.O. Box 1065, Schenectady 1, New York, for your copy of ALCO's 54-page catalog on Flanges and Welding Fittings.

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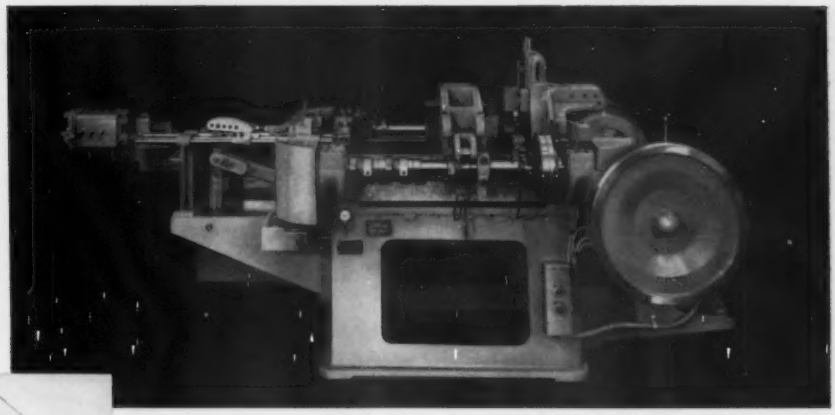
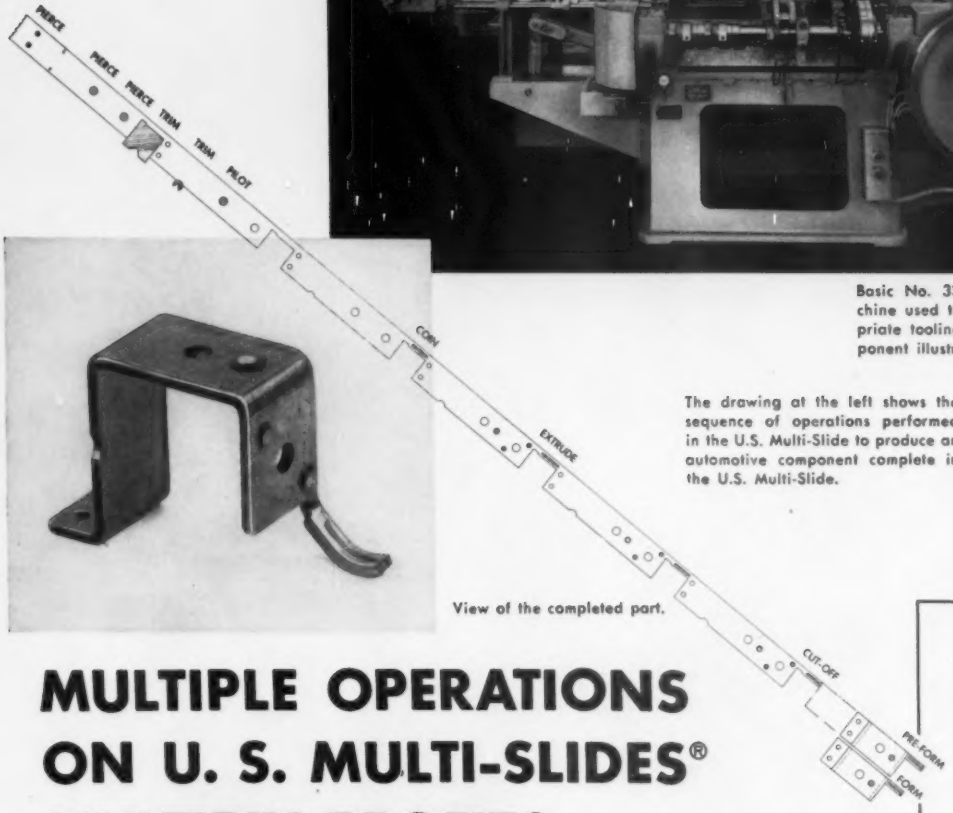


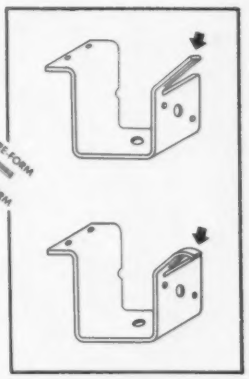
Basic No. 33 U.S. Multi-Slide Machine used to produce (with appropriate tooling) the automotive component illustrated.



The drawing at the left shows the sequence of operations performed in the U.S. Multi-Slide to produce an automotive component complete in the U.S. Multi-Slide.

View of the completed part.

MULTIPLE OPERATIONS ON U. S. MULTI-SLIDES® MULTIPLY PROFITS



A two level forming position is used to produce the automotive component. The top view shows the pre-form obtained in the upper level and the lower view shows the finished form obtained in the second or lower level forming position.

Each secondary operation eliminated means reduced piece part costs. You, like all other manufacturers, are striving to attain this end result. In the production of formed metal stampings from coil stock, the U.S. Multi-Slide may be the answer.

U.S. Multi-Slides are designed primarily for the automatic production of precision formed stampings from coil stock. Many different types of stampings ordinarily requiring secondary handlings can be produced complete on the Multi-Slide.

The part illustrated on these pages is a component for an automotive manufacturer and is produced complete without secondary handlings. The sequence of operations is pierce, trim, coin, extrude, cut off and form (2 levels). This automotive component is just one of many different types of stampings which can be produced complete on the U.S. Multi-Slide.

If stampings are included in your production program, ask for a copy of Bulletin 15-C illustrating and describing the four sizes of U. S. Multi-Slides we now build.

U. S. TOOL COMPANY, Inc.

AMPERE (East Orange)
NEW JERSEY

Builders of U. S. Multi-Slides — U. S. Multi-Millers
U. S. Automatic Press Room Equipment — U. S. Die Sets and Accessories

WHY THE FEED BAG BECAME A FLOWER POT

Remember horses? They were strong, kindly four-legged animals and they used to be essential in our lives, particularly on the farm. Then, in just a few short years, the farm equipment industry changed everything. Today's mechanized farmer produces more with less work, and enjoys more of the good things of life. Improvements in farm equipment have often gone hand-in-hand with progress in steelmaking. And, at Inland, we've been working for many years at the job of producing the *right* steels for better farming.

INLAND STEEL COMPANY *38 South Dearborn Street, Chicago 3, Illinois. Sales Offices: Chicago, Milwaukee, St. Paul, Davenport, St. Louis, Kansas City, Indianapolis, Detroit, New York. Steel products supplied to the farm equipment industry include hot and cold rolled sheets and strip, Ti-Co galvanized sheets, bars. Other products: plates, structurals, 4-Way safety plate, tin mill products, reinforcing bars, rails and track accessories, coal chemicals.*

NEWSFRONT

Fresh Backer For Leaded Steels

Production up as much as 30 pct. That's the story from one midwest machine shop, using leaded steels in turning out drilled and tapped rod couplings from bar stock. Additional advantage: tripled tool life. And, says the company, coupling failures have been reduced through the smoother inside threads produced.

Would End DPA Raiding

Defense Mobilization chief A. S. Flemming wants an end to raiding on Defense Production Act funds. If the government wants to continue aiding various mines, such as those producing tungsten, acid grease fluorspar and chrysotile asbestos, he's for it. But he wants Congress to set up special program to continue purchases of metals for which stockpile goals are already filled—and quit dipping into money needed to meet other stockpile goals.

Free Piston Partisans, All

Adoption of the free-piston engine by the auto industry would get enthusiastic welcome from transmission engineers. Reason—better torque characteristics than the present power-plant, particularly in low speed range. Thus, simple two-speed transmission could match performance of today's engines with their transmissions and torque converters.

Air Force: More Headaches

Material and money cost, loss of life aren't the end of Air Force's headaches over large number of bugs showing up in new planes, despite most rigorous testing. Accident rates are aggravating another problem—that of personnel. Commissioned ranks reenlistment rates are reported off perceptibly.

Oblique Boost For Air Conditioning

Industry trend to higher precision requirements in some assembling, other operations is advancing cause of air conditioning even more than plain old hot weather. Dust, high humidity are hazards in precision work—have to be guarded against. But it costs little or no more to obtain temperature control while obtaining humidity control, air filtration measures.

Super-Finish Data System

One large steel producer is giving a whirl to a highly refined, integrated data-processing system which permits district sales offices to place orders directly with mills. In initial try-out stages, the system is reported considerably advanced over others in steel and aluminum industries.

Better Corrosion Protector

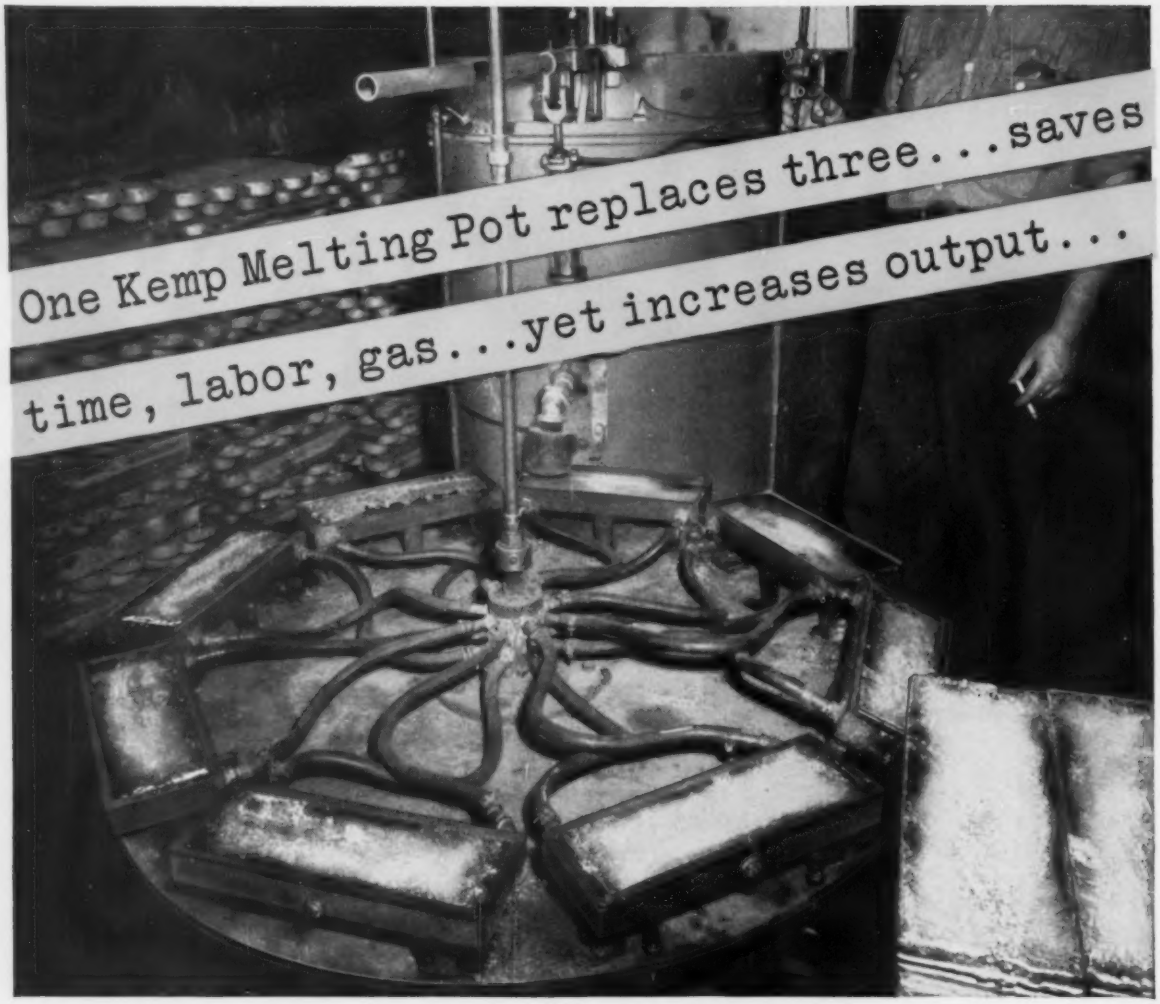
A new paint pigment promises greatly improved corrosion protection in multi-coat paint systems over iron and steel. Material will be widely announced to paint makers in July; incorporates inhibiting matter, not only in prime coat but in succeeding paint films. The new pigment tints easily; is applicable by spray or brush or other formulations. Material costs slightly more than red lead, but is said to require only half as much for same surface protection.

Flying Boat: Clipped Wings Division

A Navy experimental program on hydrofoil craft has paid off, Navy reports, to a point where small craft up to about 50 tons can be designed with confidence. Such craft proceed with the hull held clear of the water due to the dynamic lift of foils planing beneath the surface. Advantages include speeds up to 80 pct greater, with no boost in hp; greatly improved rough-water speed and riding qualities.

Mold Dressings Evaluated

Among main types of ingot mold dressings, the volatile materials offer most advantages, particularly the bituminous paints because of ease of application. So say British researchers after laboratory investigations into mold-dressing influences in reducing various kinds of surface ingot defects. Coal tar and charcoal-based dressings were found just as effective as bituminous paints but more difficult to properly apply.



Sheffield Tube Corporation reports: *Kemp Melting Pot melts 2,200 lbs. of lead per hour, eliminates down-time*

The Sheffield Tube Corporation, New London, Conn., manufactures tubes for toothpaste, cosmetics, drug specialties and similar products. Slugs for extruding are punched from thin lead sheets, which are rolled from moulded slabs. To melt large "pigs" for moulding these slabs, Sheffield formerly used three pots: two meltdown pots, feeding into a 1,276 lb. capacity holding pot. This equipment has been replaced by one Kemp Immersion Melting Pot, capable of melting 2,200 lbs. of lead per hour.

Kemp boosts production . . . cuts down-time

Formerly, one man produced about 500 slabs daily; dross formation had to be removed two or three times daily; and the pots were replaced after anywhere from 6 weeks to 6 months of operation. With the Kemp Melting Pot, two men now mould about 1,400 slabs daily. During the first 5 weeks of service dross was not removed once—and except for an occasional 10-minute valve-cleaning job there was no down-time at all.

Kemp can help you

Whatever your application, it will pay you to investigate Kemp Melting Pots. You'll benefit in many ways: Kemp units are not subject to periodic and expensive breakdowns . . . offer greater heating surface, faster heat recovery, lower dross formation, lower room temperatures. Whatever your problem, Kemp units will help cut labor costs, eliminate lost time, increase output.

Find out how Kemp engineers can provide the most profitable solution to your heating or melting problems. Write for Bulletin IE-10 today.

KEMP OF BALTIMORE

IMMERSION MELTING POTS

CARBURETORS • BURNERS • FIRECHECKS • ATMOSPHERE & INERT GAS GENERATORS • ADSORPTIVE DRYERS
SINGEING EQUIPMENT

THE C. M. KEMP MFG. CO.
405 East Oliver Street, Baltimore 2, Maryland

NEWS SECTION

MINIATURIZATION: A Big Little Trend

Reducing size, weight while maintaining or increasing capacity paying off for many industries . . . Much trail blazing already done, but it's no field for amateurs—*By F. J. Starin.*

◆ THE SET SCREW supplied by Standard Pressed Steel Co. did the trick.

Small, but just as efficient as its bigger brother, it enabled the manufacturer of a control device to reduce the size of a collar and shaft. Other part sizes were reduced accordingly. A smaller housing completed the job. Result: a device only 4 pct the size of the original.

That's miniaturization—a rapidly developing industry already paying big dividends in metalworking, electronics, and other fields—and holding promise of more to come. A few examples:

Brown Instrument Div., Minneapolis-Honeywell Regulator Co., was able to reduce by 10 to 25 pct the size and cost of a new control system for a Battelle Memorial Institute reactor.

Worthington Corp., developed a midget multi-stage boiler feed pump, equal in capacity to larger units, with the added advantage of increased revolutions per minute.

International Salt Co., Inc., gets more production from miniaturized evaporators than earlier, larger models.

C. F. Braun & Co., saved $46,000 in miniaturizing the control room panel of an oil refinery.

Proof of the Pudding

"Miniaturization is now a basic trend in almost all types of production, to save weight and space, improve functioning without increasing size, or to create new markets for products," says J. G. Shennan, president of Elgin National Watch Co., currently one of the leading firms in industrial miniaturization projects.

Here's some proof:

Of the half dozen major producers of miniature bearings, at least half have just completed, or have in the works, major expansion programs. New Departure Div. of General Motors has enlarged its operations considerably; Miniature Precision Bearings, Inc., dedicates a new plant more than twice the size of its original works, this week; New Hampshire Ball Bearings, Inc., is starting new plant construction.

Other companies are doing a thriving business in miniature stators, wire thread inserts, hysteresis synchronous motors, speed control devices, shaft position converters, and other components.

What's behind industry's interest in miniaturization? Basically, it's the desire to compress as much working equipment into the smallest possible space. Rising costs of plant expansion put space at a premium. To meet ever-present competition, manufacturers are straining to reduce costs by making operations more compact and

The More From Less Idea

Miniaturization: A Definition

- **Reduced size or weight, capacity maintained**
- **Reduced size or weight, capacity increased**
- **Maintained size or weight, capacity increased**

Where to Start:

◆ **Critical Areas—those which in normal use are most likely to fail first—often oversized, but not strong enough fasteners — H. Thomas Hallowell, Jr., president, Standard Pressed Steel Co., Inc., Jenkintown, Pa.**

◆ **Miniature Bearings—replacing larger bearings or bushings permit adjacent components to be designed to closer tolerances and reduced—R. H. Carter, chief engineer, Miniature Precision Bearings, Inc., Keene, N. H.**

◆ **Get Expert Help—Product specialist can't learn as fast about miniaturization as miniaturization expert can learn about a product—Earl Schaeffer, chief engineer, Elgin National Watch Co., Elgin, Ill.**

✳ = Job's The Same, But Dimensions

efficient. Less bulk and weight in many products provide an important sales advantage.

Not for Amateurs

Miniaturization-minded companies are still doing a lot of trailblazing, are developing new production and design techniques. What outfits like Elgin have learned is making it easier for firms with an eye to miniaturizing their products to develop size-reduction programs.

It's no field for amateurs. Finish, tolerances—even lubricants—are exceedingly fine. Special gages and scales have had to be developed. High strength alloy steels and titanium are playing a role. Machine tools must be specially adapted to meet specific fine tolerances and accuracy of miniaturized parts. Engineers and production men must be specially trained.

✳

FASTER Spinning, smaller General Electric blade does a bigger job.

The industry has problems, too. One of them is high tooling expense, which tends to limit acceptable business to high-quantity runs. According to Earl Schaeffer, Elgin's chief engineer, business is being turned away unless volume justifies cost of tooling up.

As a by-product of its experience in the precision watch parts field, Elgin has set up a special Micronics Division to capitalize on the precision machine tools it had to develop to make miniaturized components. J. Shennan, company president, expects Micronics Div. sales to hit $25 million within three years.

Some current Elgin projects include development of a miniaturized motion picture camera; designing and building a machinery speed governor, including production and assembly equipment; and precision parts and tools for a major concern in communications. Latter project includes use of a specially-devised punch and die block assembly accurate to 0.0001″, and drills as fine as 0.0028″ in diam., accurate to 0.00003″. U. S. Bureau of Ordnance has commissioned the company to develop automatic machinery to cut and polish jewel bearings.

What's Been Done

Among Elgin developments are a high speed counter 1/6 the size of its predecessor, machine safety device 2/3 size of original unit, with resultant reduction in production costs of about 80 pct, an electro-mechanical portable voltage supply with weight reduced from 10 lb to ounces, and a miniature battery about half the size of a penny, and twice as thick, delivering 1.5 volts.

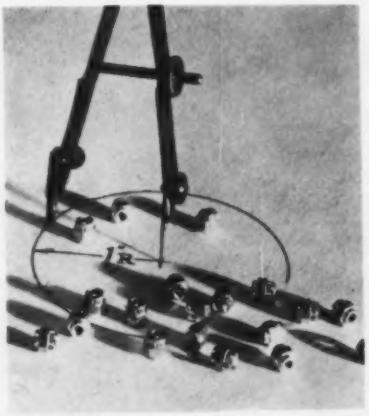
✳

AS big as Mr. Lincoln's tie is this vital tungsten carbide pivot bearing.

An excellent barometer for the future of the trend is the miniature anti-friction bearings industry. Bearings classified as miniature run from ⅜ in O.D. to dimensions so small that 500 can be placed in a thimble.

Miniature Precision Bearings Inc., which began operations just 16 years ago with standard line of 5 bearings, now is tooled to turn out over 500 different types.

✳



MICROSIZED SPS self-locking clinch nuts are applied without a wrench.

All of the major firms in the miniature bearings field report 1955 sales considerably up over previous year, and 1956 sales are running ahead of 1955.

Big Deals

Some of the major metalworking markets for miniature bearings include synchro mechanism (as small as ¾ in), gear trains, actuator lever systems, differentials, and small motors.

But not all components miniaturized with these bearings are usually considered small in their entirety. Bullard Co., Bridgeport, Conn., uses miniature bearings in control device of a vertical turret lathe. R. C. Bullard reports that the company switched to miniature bearings because of "limited space at points where they are located."

MPB miniature bearings are

Are Diminished

also used by Pratt & Whitney Co., Inc., in vertical and horizontal drive gear boxes, and the automatic tracer of their BG 22 Keller machine. Scott Testers Co., uses miniature bearings in its tire cord testing machines.

Special requirements of miniaturization have given rise to another specialty—development of gages and scales accurate to the necessary tolerances. By making use of other new miniature products such as bearings and transistors, gage makers have come up with such items as a device which will measure electric current as low as one billionth of a microampere (Minneapolis-Honeywell Regulator Co.); a scale so sensitive it will weigh a pencil mark on a piece of paper (Elgin National Watch Co.); gage for sorting parts of different sizes accurate up to 0.00002 in (Cleveland Instrument Co., Inc.); instrument to detect scratches one millionth of an inch deep on metal parts (Micrometrical Manufacturing Co.).

Most of the accurate devices are

NEEDLE and thread dwarf these dimensionally accurate Elgin set screws.

themselves miniaturized, more efficient versions of their antecedents. A new Bristol Co. potentiometer has a face 5x5 in. compared to 19x15 in for its predecessor. The same company has a new torsion balanced control switch which weighs less than a sheet of paper.

Special lubricants designed to operate under unusually fine tolerances, yet rugged enough to stand up at either high or low temperatures have been developed. Some are expensive—as high as $75 per gallon—but economical in mass-produced components since very little is required per unit.

Metals' Role

Metallurgy plays a key role in the miniaturization picture. Stronger metals pave the way to

PHILCO amplifier boosts 70 decibel gain, full power gain of 10 million.

reducing size and weight while performing equally as well as components fo larger dimensions.

Elgiloy, developed by Elgin National Watch Co., in cooperation with Battelle Memorial Institute, is a good example. Elgin says the cobalt-base alloy has a 15 pct

PENNY won't come close to buying one of these jewel bearing blanks, even before grinding and polishing.

ABE never saw this in his day. It is an Elgin micro-cell battery, capable of delivering up to 1.5 volts.

higher torque than carbon spring steel, 90 pct greater fatigue resistance and 270 pct better resistance to set.

Things To Watch

There's still plenty of development work going on, which will eventually follow the beaten path to various metalworking applications. Here are a couple of items to look for in the immediate future.

Automotive company aims eventually to make all its models self-lubricating, working on improved power system to do the job, featuring miniaturized parts.

Lockheed Aircraft Corp. engineers have come up with a television camera measuring 2 in. x 5 in. x 1¾ in., weighing only 1½ lb. Developed and currently being used for testing propjet aircraft, it can observe heretofore inaccessible areas while equipment is in operation.

Miniaturization has by no means been restricted to plant production applications. Boon to executives forced to keep their offices in their briefcases is the development of a portable recorder 1⅞ in. x 3⅞ in. x 8½ in., weighing about 3¼ lb. Battery operated, the machine can take about an hour of dictation.

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LABOR

NEGOTIATIONS: According to Hoyle

No wild cards, but no pat hands as steel companies, steelworkers open negotiations . . . McDonald opens with big ante, but doesn't have the hand to win whole pot . . . Companies may call bluff—*By Tom Campbell.*

◆ THE EIGHT-MAN wage negotiation meeting to decide the future of steel industry wages, costs and prestige was similar to a poker game. Play your cards! Bluff—and tell nothing. After a week of meetings, representatives of the "Big Three" steel firms and the United Steelworkers of America still yielded little information.

While the "front" game was being played at the Roosevelt Hotel in New York, top level negotiators were backed by a bank of steel industry lawyers in the nearby Biltmore and Barclay Hotels.

Top level officials of eight or nine steel companies—other than the "Big Three"—are in touch with the "hub" at the Roosevelt. It is believed that Dave McDonald and his chief negotiator Arthur Goldberg are in "informal" contact with various steel officials. This means merely that the "guts" of the negotiations are taking place far from the "maddening" crowd of reporters.

STRAIN OF crucial steel-labor negotiations shows on faces of David J. McDonald union leader, and John A. Stephens, top U. S. Steel bargainer.

No Quick End

A short lived and amicably settled tiff with the nation's press occurred late last week. Newsmen felt that the joint committee of steel and labor people were a little too short with them—in news and in appearances.

The steel side was expected to present its counter-proposals some time this week. The union will take at least three or four days to turn them down. By then the down-to-earth haggling should get underway. Hopes for an early settlement were fading rapidly.

Late last week, over the weekend and far into this week, steel industry and union lawyers—separately—were taking on reams of paper work. With the entire steel contract to be completely rewritten, it is clear how many "i's" must be dotted and "t's" crossed.

Lawyers of steel firms other than the Big Three are having their chance to get a look at what is being done. Steel company negotiators are briefing them. Dave McDonald, Union chief, is also briefing his top men on closed door events.

Follows Pattern

Nothing has turned up so far to indicate that this year's operations will be much different than those of other years. Geniality is the keyword where negotiators meet and talk with the press. But as the days roll by and as each side gets closer to the hard realities, things will change.

There will be no last minute misunderstandings between steel firms now that the meetings are on a quasi-industrywide basis. Whatever is decided later this month can be quickly put into a contract. Skeleton contract sections are constantly being written and rewritten in the Biltmore rooms by the "around-the-clock" working lawyer crews from various steel firms.

The economic—and emotional—issues may not draw sparks in the secret bargaining meetings at the Roosevelt for at least another week or 10 days. A miracle could happen with a quick settlement and satisfactory contract. That seems improbable in view of a few current facts:

Why It's Tough

■ Steel industry leaders are under the heaviest barrage of pressure in recent years from their customers, other industrialists and

certain government people to "hold the line."

- "Poor mouth" stories about the operations in the third quarter are a dime a dozen and have had an effect on some steel company officials.
- A few key government officials have privately expressed concern about the effect a big steel wage-price package will have on the rest of the economy.
- Many steel people are giving lip service to the statement "now is the time to take a stand." Conversely a lot of other steel people are fearful that a knock-down-drag-out fight with the union would raise hob with business—and Republican chances of winning the election.
- Dave McDonald "has got" to get a big package this year, in his opinion—and in the opinion of his chief negotiator Arthur J. Goldberg. (This is the same pitch each year.)

Late Start

All of these factors are deterrents to a quick settlement even though many steel and union people look for a signed contract before June 30. The counter proposals are reaching the union later than usual this year.

The counter proposals to be given the union by the Big Three this week will probably consist of a diluted supplementary unemployment benefit plan (SUB) and close to 10¢ an hour wage boost—and nothing more. As usual, this will be turned down. Whether the union will make a real pitch for premium time for weekend work is something that Dave McDonald probably hasn't quite made up his mind about yet.

Predictions

An IRON AGE summary of what it has held in past issues to be the probable outcome in the wage hassle includes: a settlement approaching 20¢ an hour package (a big wage hike, a small amount of fringe and the SUB); better than even chance of a steel strike; and a $10 to $11 a ton price increase to offset the wage cost and to supply some money for expansion.

GOVERNMENT

A special editorial

What If Ike Doesn't Run?

◆ AGAIN, the question of whether or not Ike will run is highly emotional with most people. Millions will be sorely disappointed if he is not their candidate. Thousands upon thousands of businessmen feel things will go to pot quickly if he doesn't run.

Many of us have wrapped up government and confidence with our affection for one man. We take the business temperature at the White House. We have done this before but never with the same intensity. At times our objectivity seems to have left us.

It isn't that the President has leaned over backward for business. He hasn't. He has simply insisted on a fair and reasonable treatment for all. He has implanted confidence.

What he has done at home he has done also abroad. The sense of awful expectancy in the capitals of the Free World is the same as exists here in America. What makes it worse for him is that he knows all this.

Of course confidence will be shaken among businessmen if Ike doesn't run. But these men have been through all this before. They are better able to face such anxiety than they were earlier this year.

It is true too that the stock market will take another temporary nose dive if the President changes his mind. But the market has used Mr. Eisenhower's health as its excuse for recent declines.

Will firm commitments for expansions, for new homes, for new roads, for defense of our country and for genuine growth fall apart if Mr. Eisenhower fails to run? We hardly think so. Nor should you, if you shake aside your fear.

There is no question of what will happen to the spirits of the majority of our people if Ike sticks to his decision to run. He will inspire the same kind of confidence as he does now.

But what if he decides otherwise? That will be the test of your character as a businessman. He has had implicit confidence in you—and in your ability to keep this country strong. He has done his part as far as you are concerned.

Will you do less than he has done for you? Will you justify his confidence in you by carrying on?

Tom Campbell

EDITOR-IN-CHIEF

BUILDING: Records for Equipment Makers

Makers of construction equipment predict an $800 million year for 1956 . . . Even better year predicted for 1957 . . . Government highway program means fat orders . . . Expansion planned—*By K. W. Bennett.*

◆ WITH THAT long awaited $52 billion of government highway planning still to come, builders of construction equipment figure the industry will exceed last year's record sales totals by 20 pct or more. In dollars, it means that value of construction machinery will aggregate at least $800,000,000.

Despite the soft spots reported in the industrial scene elsewhere, producers report no falloff in incoming orders, no real indication that the tightness of credit is slowing contractor buying, and that, if anything, demand seems to be quickening slightly.

Figures available through the end of April indicate that the planned backlog of earthmoving work and construction jobs that will call for purchases of heavy construction equipment was still moving up. One producer reports his sales, from the most immediate reports available, are up 35 pct for the year thus far. Another, though exceptionally high, has actually boosted factory sales over the year ago period by almost 49 pct.

To the question, "But where is it all going to end," most builders point out that the government highway program is finally beginning to give some indications of getting off the ground at Washington, D. C. The booming equipment market thus far has been borne largely by state building programs as well as the record amount of industrial and commercial construction. The fact that in the past few weeks several state construction programs have run into bond issue trouble doesn't seem to have worried construction builders unduly, and seems to have affected their customers' willingness to buy equipment even less.

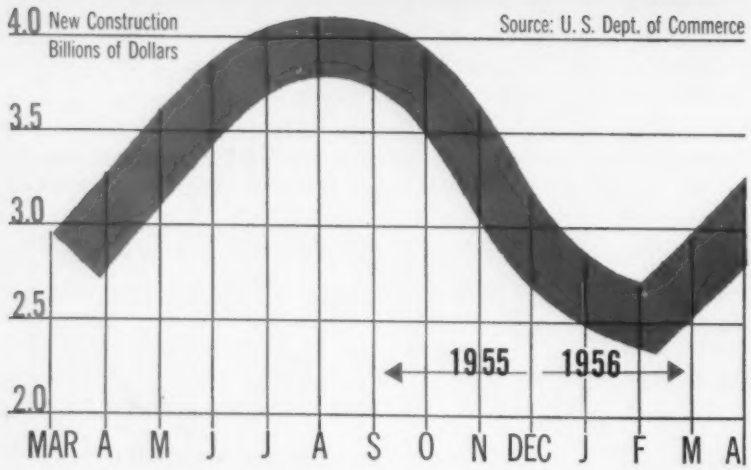
Expansion Coming

A substantial group of equipment producers feel they'll need to boost productive capacity to meet fresh waves of consumer demand when the Federal highway program finally arrives. LeTourneau is expected to announce expansion programs this year. Euclid is still growing and has purchased ground recently for further expansion, and Caterpillar is well into a $200 million program. International Harvester is expanding production lines.

Meantime, as the market grows, a really stiff competition is developing. Crawler tractors, which take about 48 pct of total construction equipment expenditures yearly, are receiving special attention. Most concerns report increased horsepower in the 1956 model and it's common comment that the figures will be boosted, whatever the cost, again next year.

Most major producers are expanding their lines to cover more equipment types. Euclid division of GM, for instance, wasn't a major factor in crawler tractors in 1955, is reported in the market strongly this year with considerably more sales effort still to come.

Behind Construction Equipment Boom



FURNITURE: Metals Crack Wood Monopoly

Aluminum outdoor furniture is pacing a multi-million-dollar industry . . . Gradual acceptance of iron in parlor adds new horizons for designers . . . Modern homes, institutions good prospects.

◆ METAL FURNITURE manufacturers are looking for record sales this year in a market that has catapulted from $50 million annually to $180 million in the decade 1945-55.

Aluminum summer furniture leads the way, accounting for about 60 pct of the total volume. Coming in for a larger share of the gross is black iron. Its revival is causing chrome plated dinette sets to give some ground.

Boom Factors

Alfred J. Siesel, executive secretary of the National Assn. of Summer Furniture Manufacturers, predicts the market will continue to grow indefinitely. Major factors are the movement to suburban living, the trend toward small rooms in modern architecture and increased use of metal furniture by institutions.

There are no giants dominating the metal furniture industry. The NASFM represents most of the industry's 100 leading firms, but there are innumerable small companies operating locally throughout the country.

"The aluminum furniture business particularly is a natural for small concerns, Mr. Siesel says. "All they need to start is a garage, a bending machine, a bundle of tubing and a bolt of material and they're in business."

Most of the larger manufacturers are located in New York, Chicago, Florida and the West Coast.

What's Popular

Aluminum's popularity is due primarily to its lightness and nonrust features. Higher priced lines this year are going in for anodized aluminum furniture to retard oxidation or corrosion.

Manufacturers specializing in black iron home furnishings have discovered an almost limitless market in hotels, motels and other institutions requiring durable furniture which is both attractive and inexpensive.

The term "black iron" includes wrought iron and steel which has been finished to resemble wrought iron. Steel offers manufacturers an opportunity to engage in mass production, where wrought iron, requiring a lot of hand workmanship, would be prohibitive costwise on the general market.

New Methods

To make their product more appealing, iron furniture specialists have come up with improved pickling methods, new designs and materials. At least one firm, John B. Salterini Co., guarantees its outdoor wrought iron furniture against rust for 10 years.

Another firm, The Troy Sunshade Co., prepares metal surfaces by washing in an emulsion-alkaline cleaner, phosphatizing with a zinc phosphate coating of 225 to 250 mg per sq ft, applying coats of an alkyd enamel, flat black and finish onto an epoxy resin primer. The total dry film thickness is 1.75 mills.

These firms also are using extensively such new metalworking materials as expanded metal and hardware cloth.

The high cost of nickel and the difficulty in obtaining that metal for plating operations had something to do with slackening chrome furniture output. With the changeover to black iron gaining momentum, several manufacturers in 1954 temporarily suspended their chrome lines in favor of the black finish. A few have discontinued chrome indefinitely.

Colleges are starting to buy black iron for use in dormitories for the same reason. The Veterans Administration reportedly has placed a large order with one company because of the casual, relaxing appearance of black iron furniture. Officials hope it will have therapeutic value.

The Changing Times in Metal Furniture

◆ SCARCELY ANYONE considered bringing metal furniture into their homes prior to 1934. The small amount manufactured then was confined to wrought iron garden sets and steel porch gliders.

When the first chrome plated dinette sets appeared on the market that year, producers had a tough time promoting them. It wasn't until 1946 that the indusry managed to gross $50 million at the wholesale level.

When aluminum made its entrance into the outdoor furniture field that year, sales skyrocketed. In 1955 it accounted for 60 pct of a $180 million volume.

Coming up from behind is black iron furniture which metal-conscious homemakers brought into their living rooms and bedrooms, $45 million last year.

Two years ago, chrome plate accounted for 70 pct of the metal dinette business. Last year it dropped to 50 pct. This year it may go as low as 30 pct.

DISTRIBUTION

NICKEL: User Gripes Getting Results

Senate committee hearings air complaints against defense priority system . . . Small users paying premium prices . . . New allocation techniques may result . . . Government policing criticized—*By N. R. Regeimbal.*

◆ BITTER COMPLAINTS of small nickel users that existing distribution systems are unfair may or may not be legitimate, but they are getting results. Heavy pressure is building up for revisions in the methods of allocating both defense and non-defense supplies of the scarce metal.

There is little likelihood of any new legislation covering nickel distribution, and virtually no chance that the government will reimpose end-use controls over the metal, but there is a strong possibility that some new allocation techniques will be coming in the not-too-distant future.

Major complaints are that the existing defense priority system cannot, or is not, being policed by the government; that the voluntary allocation of civilian nickel supplies has never been reviewed by government since it was established by a single official; and that information on which to fairly assess distribution has up to now not been available.

Existing voluntary allocation of nickel for civilian uses is outdated, the Senate Small Business Committee suspects. A committee spokesman points out that when controls over civilian uses were lifted in 1953, the government and International Nickel Co. made an agreement on how allocations would be made to the firm's seven distributor customers, and agreed to permit Business and Defense Services Administration to check its books under the system.

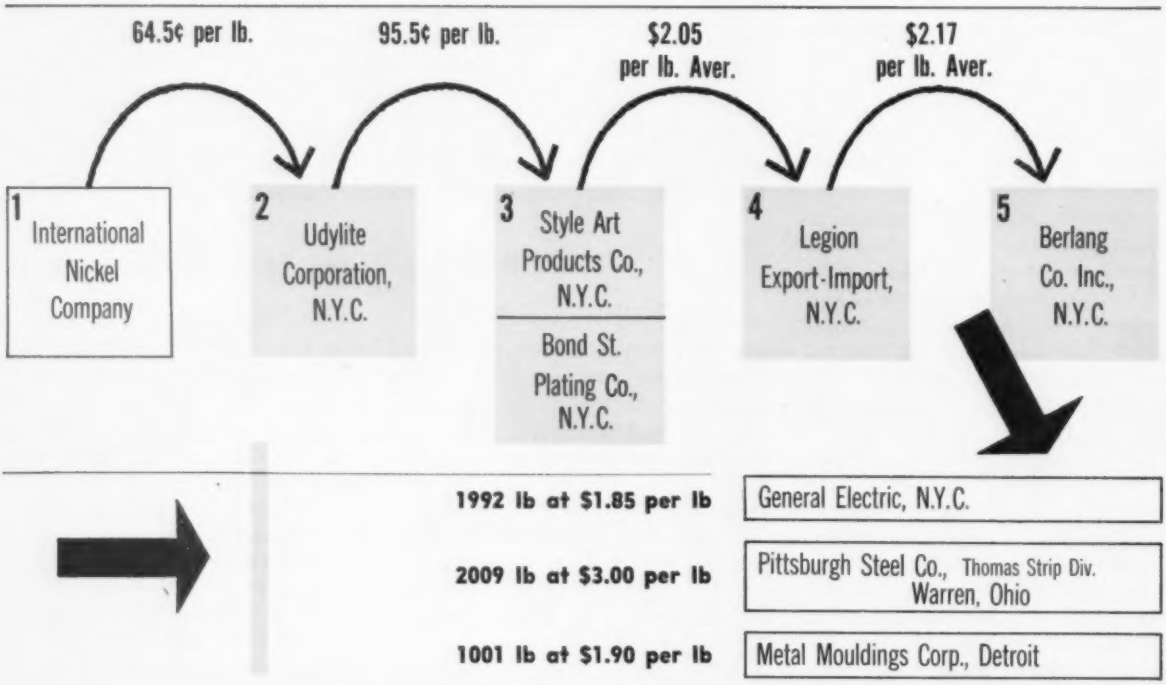
Little Man Hurt

The committee has no quarrel with Inco. But it contends that since the original allocation was set up by a single BDSA official it has never been changed or even reviewed, and could be due for some amendments.

Result of the existing systems of passing out defense and non-defense nickel, according to charges flying in Congress, is that small metal users either can't get

How 5002 lb Of Nickel Tripled In Price

Source: Senate Small Business Committee


64.5¢ per lb.
95.5¢ per lb.
$2.05 per lb. Aver.
$2.17 per lb. Aver.
1 International Nickel Company
2 Udylite Corporation, N.Y.C.
3 Style Art Products Co., N.Y.C.
Bond St. Plating Co., N.Y.C.
4 Legion Export-Import, N.Y.C.
5 Berlang Co. Inc., N.Y.C.
1992 lb at $1.85 per lb
General Electric, N.Y.C.
2009 lb at $3.00 per lb
Pittsburgh Steel Co., Thomas Strip Div. Warren, Ohio
1001 lb at $1.90 per lb
Metal Mouldings Corp., Detroit

nickel or have to pay premium prices, which hurt their competitive position.

Small Business Committee investigators have testified to a case where nickel originally sold by Inco for 64.5 cents a lb was eventually purchased by Pittsburgh Steel Co. for $3 (see chart).

BDSA has been surveying nickel allocations made under the existing system for about a year, has restricted a host of firms from free operation under the defense nickel rating system, and indicates it may turn some cases over to the Justice Department for criminal prosecution.

Under these pressures, the nickel allocation system seems doomed for a change.

Watch Defense Take

Office of Defense Mobilization, in a move designed to keep closer tabs on defense nickel needs, has put the metal under the Defense Materials System to try to make sure the defense "take" does not exceed actual needs.

For some time now, purchases of defense nickel under priority ratings have exceeded Pentagon advance estimates—which leads to the conclusion that some priorities are being used to get metal for the civilian market.

The Small Business committee is convinced that there are cases where orders bear a fictitious priority number. The committee points out that the present system is not self policing and perhaps should be changed.

How It Works

Under the present system, a buyer files an order with a distributor and puts a "DO" number at the top. If the number is plausible, the distributor fills the order, and files it with Inco. Inco lists all its DO numbers, and BDSA periodically is supposed to make an inspection trip to look them over—but there are literally thousands, and it is highly doubtful that in a few days they are all carefully scanned, the Committee contends.

Meanwhile, Administration is opposed to reimposing controls over civilian uses of nickel.

MARKETING

POWER: Pushes Silicon Growth

U. S. Steel gets fast-tax write-off for grain-oriented silicon expansion . . . More producers tighten up fight for share of growing market—By G. J. McManus.

◆ COMPETITION IS increasing in the grain-oriented silicon steel market. Ever-increasing demand for a profitable, though tricky product is encouraging newcomers and old-timers in the field to expand their productive capacity.

U. S. Steel has just received a fast tax certificate for expansion of finishing facilities at Vandergrift, Pa. If it spends what the certificate calls for, it will have put more than $60 million into silicon steel production since 1953. Prior to that, the company had produced only straight grades of silicon, except for small pilot quantity lots.

Newcomers In Field

Crucible Steel Co., in a joint venture with Allis-Chalmers, began making commercial shipments just last year. Wheeling Steel is said to be considering entering the field. Before U. S. Steel and the others got into the act, the grain-oriented market was pretty much the province of Allegheny Ludlum and Armco.

Basic reason for new entrants is the strong and stable market position of grain-oriented. The whole electrical sheet group appeared headed for a record year at the close of first quarter. Since then, the market generally has fallen off slightly, but grain oriented shows no weakness.

Grain oriented is tied to power distribution. The utilities figure they will continue at the present pace of doubling power production every 10 years.

In addition to entirely new applications, a big transformer program is in the works. Utility companies underestimated the rate at which power consumption would climb.

Electrical Sheet Shipments

(Net Tons)

1956	*
1955	791,000
1954	589,000
1953	820,000
1952	607,000
1951	758,000
1950	717,000
1949	436,000
1948	546,000
1947	476,000
1946	306,000

* Shipments first 4 mos.: 300,000 net tons.

The tax write-off approval granted U. S. Steel did not clarify the position of grain oriented silicon in the defense expansion program. Supposedly the target capacity of 250,000 tons annually was reached last year, although the category has never been officially closed.

Research

From a technical standpoint, producers are trying to develop a sheet that is "double oriented." At present, the alignment of silicon sheet crystals is in one direction only. This is particularly good for transformer applications, where magnetic parts remain in fixed positions. But usefulness of grain oriented products in motors and generators would be greatly extended if two-way alignment could be produced.

There have been rumors that a new material, offering greatly improved orientation, will be announced soon. The new product, said to be a non-silicon alloy, would mean significant increases in motor efficiency.

REACTORS: U. S. Leads Global Race

USSR and Britain predict they will outstrip our atomic power capacity by 1960 but our scientists say otherwise . . . Foreign nations with fewer reactors hope to get more power per installation.

◆ THE U. S. appears to be leading in the race to build atomic reactors, despite claims by USSR that it will have 2000-2500 megawatt atomic power capacity by 1960 and the United Kingdom's claim that it will have 1200.

The U. S. runs a poor third on predictions—expects to have only 900 megawatts of nuclear power—but runs a strong first on actual installations in operation.

Reported by J. A. Lane of the Oak Ridge National Laboratory, the U. S. currently has 22 research and test reactors in operation as of late 1955, compared with 15 research reactors active in all other countries. By 1960 the U. S., it's estimated, will have 54 research reactors in action as compared with an estimated 50 in other nations.

In the field of atomic reactors producing power, the U. S. is currently operating seven "power reactors" or prototypes, and there is one in operation abroad. By 1960, it's figured the U. S. will have 37 in operation; foreign nations will have 81. On this basis, it would seem that the Russians and others are hopeful of getting much more power per reactor by 1960 than does the U. S. Currently, odds are that our scientists are more nearly correct in their projection.

For one thing, the Duquesne reactor will produce 60,000 kw of electric power at a cost of $85 million by fall of 1957. But in the process of building this reactor, and already included in the total bill, are costs for a second reactor core that will outproduce the first. The more reactors you build, the more you learn about the new ones. Even with its original core, the Duquesne reactor is expected to go from 60,000 kw of power produced in its early operations to a peak of 100,000 kw as more is learned about the reactor by operating it.

Building Progress

Reactors are virtually mushrooming. At Chicago, for instance, an experimental reactor (not for power production but for isotope production, study of materials under nuclear bombardment) will go critical within the next two weeks at Armour Institute, for use by industrial firms. Argonne Laboratories in the same area has one reactor in action, is building three more; two of which will stay at the lab, and one may be shipped to another site, but could still be retained for use by AEC at Chicago. Construction of a sixth reactor, this one for electric power generation, is a prospect for the immediate future.

Controls Modified

Comforting words from Westinghouse, which is author of the Duquesne unit. Reactors are in no danger of blowing up, operation has proven safer than even optimistic predictions. Control systems are growing simpler, and even a saboteur, doing his worst, would be better off using a few sticks of dynamite than attempting to cause a reactor to explode.

Coming soon, according to Westinghouse researchers: "steam bars," columns of water trapped in the atomic pile, which would absorb neutrons and serve as reactor controls to replace the hard-to-work metals now used as control rods—hafnium, cadmium, and others.

ATOMS:

AEC contracts to help in Atomic Electric Co.

◆ YANKEE ATOMIC Electric Co., Boston, Mass., has signed a contract with Atomic Energy Commission in which the government agency will assist in the development and operation of a large nuclear power plant which the company plans to build in Rowe, Mass.

The pressurized, light-water cooled and moderated reactor and generating equipment will be capable of producing 134,000 kws of electricity, which will be distributed to the several utility companies which constitute Yankee stockholders.

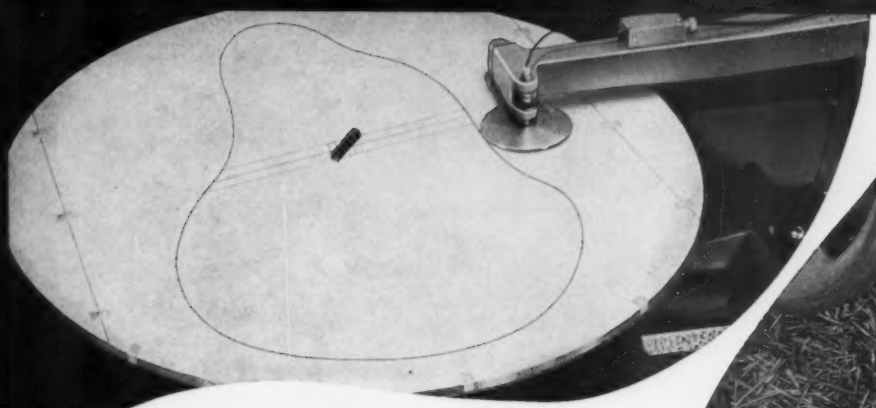
Construction will cost about $34.5 million, of which $18.5 million will be for the reactor and reactor equipment. This cost will be borne by Yankee Atomic Electric Corp.

Research and development will cost about $5 million. Under the contract AEC will perform about $1 million worth in its own facilities, and underwrite up to $4 million worth done in private industry.

Information gleaned from the research and development program will be available to both company and AEC on a non-exclusive, irrevocable, royalty-free basis.

Westinghouse Electric Corp. has been designated development and design agent, and Stone and Webster appointed to handle the construction.

Contract is the first to be concluded under Atomic Energy Commission's Power Demonstration Reactor Program.



Here, the non-contacting tracer follows the large-scale contour drawing easily prepared with electrically conductive "ink." For this job, a 10:1 drawing-to-workpiece reduction ratio is used, but any desired scale such as 20:1 or higher can be selected.

Following the action of the tracer, the cutter reproduces the exact shape of the drawing on the workpiece. Due to the selected reduction ratio, any errors in the drawing are reduced in the same proportion; resulting in accurate milling or grinding.

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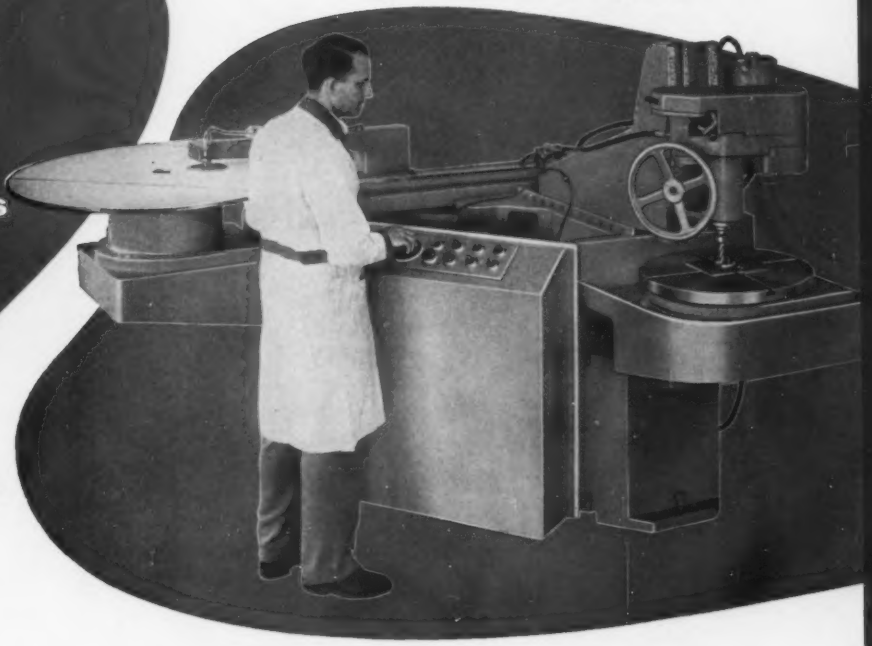

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- **extremely accurate**
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EXPANSION IN INDUSTRY

New Foil Plant

Reynolds Metals Co. will have a new aluminum foil plant at Torrance, Calif., very soon. Building to house the proposed new operation has been purchased from the Pacific Electric Co.

Plans for altering the plant to house the aluminum works have been formulated and work is expected to get underway early this summer.

Finished plant will be capable of producing aluminum foil in widths up to 60 in.

Double Titanium Sheet

Crucible Steel Co. of America will contribute part of the $400,000 which its affiliate Rem-Cru Titanium, Inc., will spend to increase titanium processing facilities at Crucible's Park Works, Pittsburgh. Project is expected to increase titanium sheet rolling capacity 100 pct.

Improvements include installation of a continuous double row furnace for heating titanium slabs, erection of a new building to house a bar yard and auxiliary processing equipment, and remodeling of the sheet mill.

Titanium is melted at Rem-Cru's Midland, Pa., plant and processed into mill products at Crucible facilities.

Improved facilities will be devoted entirely to titanium. Program is result of large increase in demand.

Plant Will Process Fines For Openhearths

◆ PRODUCTION facilities are being completed in the Delaware Valley area to turn out "blocked iron" cylinders — agglomerates which bind together high grade iron ore fines for direct charging into openhearths.

The plant which will produce the cylinders is being built adjacent to the Pennsylvania Railroad's ore pier at Greenwich Point in Philadelphia by the Blocked Iron Corp. of America. Cost is reported as more than $1 million. It is scheduled for operation by this August, with plans calling for the building of three similar units during 1957.

By using the railroad's nearby ore unloading facilities, the Blocked Iron plant is designed to offer fast, mechanized handling of both foreign lump ore and fines. Unloading equipment, now being enlarged, will provide by next November a capacity capable of handling more than 5000 tons of ore per hour.

Lump ore and fines will be fed from the pier into a screening plant for separation. After lumps are extracted, the fines will be combined into high density agglomerate cylinders by Blocked Iron's cold binding process. These cylinders, which weigh about thirty pounds, will be shipped to the east and mid-west.

Expansion Briefs

Union Carbide Nuclear Co., division of Union Carbide and Carbon Corp., N. Y.; new uranium processing mill, Rifle, Colo.; new ore receiving stations and chemical upgrading plants, Slick Rock, Colo., and Green River, Colo.

Esso Shipping Co.; two new tankers being built, speed increased with added cost paid for by Maritime Administration; ships being built at Newport News Shipbuilding and Dry Dock Co., Newport News, Va.

Robertshaw - Fulton Controls Co., new laboratory building at Aeronautical Div., Anaheim, Calif.

Blast Furnace:

New stack at Fairless Works is planned.

Blast furnace capacity of Fairless Works, Morrisville, N. J., plant of U. S. Steel Corp., will be boosted 50 pct by installation of a new furnace, identical to the existing twin stacks.

New furnace will provide Fairless' openhearths with an additional 1600 tons of molten iron daily. This, will increase steel ingot capacity to take advantage of the extensive finishing capacity.

Arthur G. McKee and Co., Cleveland has been awarded the contract for construction of the stack, expected to take about a year.

Current plans call for installation of an electrostatic precipitator and primary gas washer, for better smoke control.

Koppers Doubleheader

Construction of two new plants for the production of tar and coal tar chemicals is a major project on the agenda of the Koppers Co., Inc., Pittsburgh.

Company has purchased 285 acres at Arroyo, near Chester, W. Va., for this purpose. Although no specific plans have been announced, the company says it will spend several millions of dollars.

Vaughn

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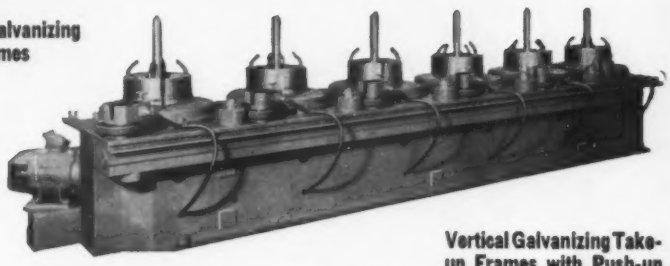
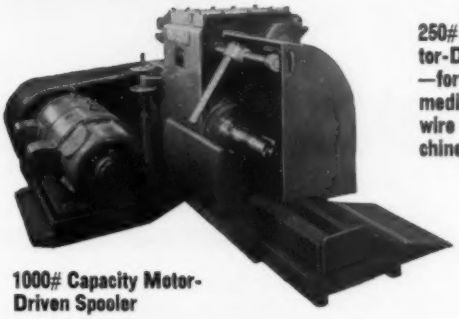
TAKE-UP FRAMES

Horizontal Galvanizing Take-up Frames



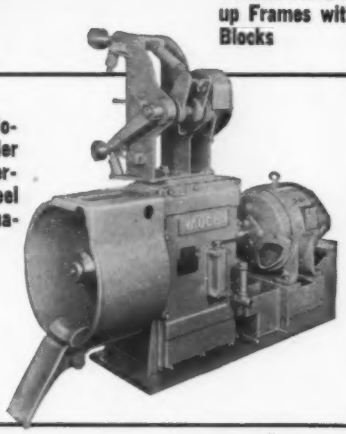
Vertical Galvanizing Take-up Frames with Push-up Blocks

SPOOLERS



1000# Capacity Motor-Driven Spooler

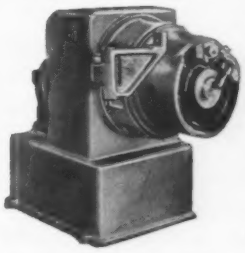
250# Capacity Motor-Driven Spooler —for use with intermediate or fine steel wire drawing machines



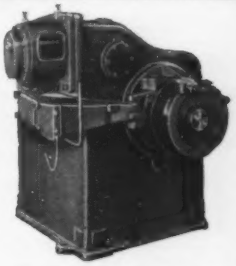
POINTERS and DIE STRINGERS

Extra-Heavy Four-Roll Pointer for 1¼" diameter low carbon steel rod

No. 1 Continuous Pointer

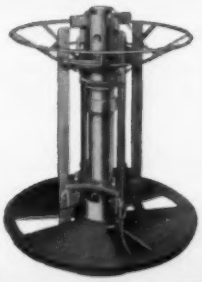


Die Stringer with Pointer

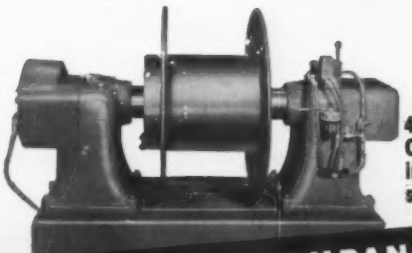


No. 1 Combination Die Stringer & Power Pointer

PAY-OFF MACHINES



Riding Type Block Stripping Spider used with Pallet and Pay-Off Ring as a Pay-Off Reel



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REPORT TO MANAGEMENT

What Will an Adjustment Involve?

If you are like most businessmen, you are reconciled to a period of adjustment. The so-called spotty elements of the economy are getting more attention than the continuing strong elements. This is natural, although it could lead to misleading conclusions.

A third quarter letdown of some significance does appear to be in the cards. But the extent can be forecast with some accuracy. It will not be of serious proportions to most business. Those most affected won't be hurt critically.

What are the specific weak spots that are causing the concern? Automotive, home building, farm implements and, to a lesser degree, appliances.

You can discount appliances for the most part. There are some weak items and some over-loaded inventories. But by and large, the industry is headed for a record year. Home building has ceased to decline and this is more than offset by other construction in business, industry and public works.

The Worst May Be Nearly Over

Distress caused by poor auto sales is not to be minimized—either in regard to the laid-off auto worker or hard-pressed automaker.

But a most significant point in Dept. of Commerce inventory studies is the fact that auto inventories in April showed much less than usual seasonal gains.

This means that cutbacks, although they may result in even lower production figures for the next three months, are having the desired effect.

Consumers Have Money

Across the whole economy, people are working, have the money to spend, and are spending it. There is a change in spending pattern, from autos and homes to other consumers goods and consumers services.

Personal spending in first quarter of this year was at an annual rate of $258.8 billion, compared with $245.8 billion, first quarter last year (adjusted.)

In spite of auto layoffs, factory hiring rose to 33 per 1000 in April while layoffs declined to 14 per 1000. May employment was at a record 65 million for the month, slightly behind all-time record.

Capital goods spending continues at record high rates. Unless something serious happens to interfere with planned capital spending, the overall economy shows little more than seasonal declines.

Meanwhile Back at the Ranch . . .

There is more than a suspicion that much of the drop in farm implement sales is political. Farmers, while admittedly suffering income set-backs, have cut their buying more than would normally be indicated—except for the fact that this is an election year.

Farmers have had a two-fold reason for pulling in their horns. One was to add pressure for a fat farm bill. The other is to get fatter farm planks into election platforms of both political parties.

The first reason is now gone by the boards. The farm bill is now passed, signed, sealed, and delivery started on some of the Soil Bank provisions, which means payment annually of $1.2 billion to farmers for taking land out of cultivation.

The signing of the bill removed this from the farmer's political action field, at the same time guaranteed fat supports that should contribute to his confidence.

INDUSTRIAL BRIEFS

Tough Grind . . . Norton Co., Worcester, Mass., has officially opened its grinding wheel plant in Santa Clara, Calif. The facility will produce a complete line of grinding wheels including the diamond type.

No Le Diga . . . A gas turbine-generator set rated 21,500 kilowatts will be manufactured by the General Electric Co., Schenectady, N. Y., for Electricidad de Caracas, a utility serving the capital of Venezuela. It will be installed in the new El Convento Station and used for daily peak load operation.

Goodbye To Broadway . . . Penn Metal Co., Inc., has transferred the general sales office of the company from New York to Boston, Mass., in order to centralize sales direction with the general executive and accounting offices.

Atom Hatcher . . . The Equipment Div., National Research Corp., has been awarded a contract by Atomic Power Development Associates, Inc., to study the problems of remote fuel element fabrication for the Fast Breeder Power Reactor.

Summer Session . . . Alloy Precision Castings Co., manufacturers of investment castings, has leased a new plant in Cleveland. Operations will begin in July with all production facilities from the company's present factories in Cleveland being moved to the new plant.

New Die Material . . . Heppenstall Co., Pittsburgh, is producing an electric induction alloy steel to create a new chromium-molybdenum-vanadium die steel called Moldtem, which it is now marketing in blocks and bars for plastic molds and zinc die casting dies.

Get 'Em Up . . . The Oster Manufacturing Co., Cleveland, plans for expansion of its line of portable lifts include models for horizontal travel.

All Clear . . . Fusing glass coatings to steel will be made available to other industrial companies by the A. O. Smith Corp., Milwaukee, for help in solving corrosion and other problems through glass-coating.

Name Again Please . . . The sales and service operations for Byron Jackson pump products will be handled under the name of Byron Jackson Pumps, Inc., a new addition to the Byron Jackson group of Borg-Warner Corp., Los Angeles.

TV Wedding . . . Admiral Corp., Chicago, has acquired the Television and Radio manufacturing Div. of Raytheon Manufacturing Co., Chicago. New acquisition will be operated as the Belmont Div. of Admiral Corp. Included in the purchase are two plants in the Chicago area, an inventory of finished television and radio receivers, and all plant equipment.

Higher Learning . . . Schacht Steel Construction, Inc., of New York and Hillside, N. J., has made a grant to the Mechanics Institute for the establishment of courses in structural steel detailing. Two classes, one for beginners and the other for advanced students, will begin in September and will be conducted under the jurisdiction of the Institute.

Up In The Air . . . A grant-in-aid for 1956-57 has been made by The International Nickel Co., Inc., to Boston College, to permit continuation of research on oxygen reduction overvoltage of metals.

Cool As A Breeze . . . Central air conditioning units that need no cooling water have been introduced by Westinghouse Electric Corp., Staunton, Va. Completely air-cooled, the residential-type air conditioners eliminate the need for large volumes of cooling water with the resulting high water bills.

Vacuum . . . The Dobeckmun Co., Cleveland, has been licensed by the National Research Corp., Cambridge, Mass., to conduct operations under patents owned by the latter relating to continuous vacuum metallizing. The processes made available to Dobeckmun are directed towards the development of techniques and equipment for the continuous metallizing of plastics, paper, textiles, and other materials with a variety of metals, including copper, zinc, and aluminum.

Direct Results Too . . . General Electric Co.'s Direct Current Motor and Generator Dept., Erie, Pa., has been realigned to include three new product sections. The department manufactures motors, generators and other equipment for direct current drives and aircraft electrical systems.

FORGINGS

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196" long
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Write for BULLETIN 16

Send for new Bulletin "Production Brazing and Soldering" and reprint "Mechanical Heating Puts Brazing on the Production Line."

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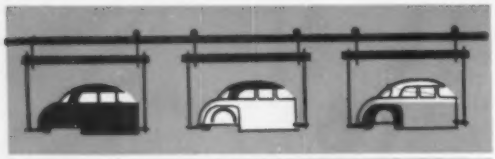


AUTOMOTIVE ASSEMBLY LINE

Spare Tire Soon Will Be A Memory

Development of new tire-within-a-tire by Goodyear to replace old baldy in trunk . . . Radical change in rear deck design likely . . . Limited quantity will be optional on some 1957 models—By *T. L. Carry.*

◆ THE TIME may not be far off when the spare tire on your car will no longer be necessary.

Goodyear Tire & Rubber Co. has just introduced a new tire which is aimed specifically at eliminating the need for spares. Called the Captive-Air safety tire, it has a spare built right in.

This is how it works. Inside the regular 4-ply tubeless tire there is another 2-ply tire that is capable of taking the full load of the car's weight in case the outside tire blows out or goes flat.

Each tire has a separate air valve and each is inflated to 24 lb pressure.

Tests Completed

In addition to the regular rim valve, the tire has a self sealing valve in its sidewall, near the rim valve. When mounting the tire, the inner chamber is inflated first and then the outer chamber is inflated by using a special inflation needle in the sidewall valve.

Goodyear says that if the outer tire is blown, the car can still be driven on the inner tire as long as there is gas in the tank. Actually, the company points out that the tire should be fixed as soon as possible but in one test a car was driven 261 miles after the outer chamber of the tire went flat.

Thousands of miles of road tests preceded announcement of the new tire. Taxicab fleets rolled up more than 4 million tire miles. The result was that 15 of the tires had blowouts and the cabs were able to keep operating. On one of the tires, both chambers went flat at the same time.

In addition, the company conducted special torture tests for the tires. These included blowing the outer casing with a dynamite cap, slashing the tire and running it over special spike boards. In every case, the inner tire held and the car did not swerve noticeably after the blowout.

Stylists Happy

Idea behind creation of the tire is to eliminate the need for pulling over to the side of the road to change a flat. Anybody who has had to change a tire at the side of a high-speed super highway knows the danger involved.

In addition to the obvious safety features of the tire, if it is ever adopted by the auto industry as standard equipment, it will be welcomed enthusiastically by car stylists.

Because the tire can eliminate the need for a spare, it will be possible to redesign a car and make the rear deck much lower. In addition, there will be more room in the trunk for storage.

Selling the public on the idea that a spare tire is no longer necessary is going to be a tough job. Goodyear admits that it will take a lot of conditioning.

Production Begun

As a result, there has been no great rush by the auto industry to introduce the tire as standard equipment on next year's cars. However, Goodyear says that it is possible that the tires will be an option on some of the 1957 models.

It is likely that if the tires are used, they will be available only on low production models such as

More Woes, Some Hope for Studebaker-Packard

◆ SPECULATION on the future of the Packard car continues to run wild. It is an open secret that the division has postponed, at least temporarily, its tooling orders for 1957 models.

This is probably the upshot of failure of the Studebaker-Packard Corp. to obtain new financing. It was badly needed to pay for tooling of a new car that would be competitive with the completely re-styled cars that are expected next year.

Predictions are that the car is in for another facelift instead of the major change that was planned. Even if tooling orders were placed immediately, a new car would not be ready for introduction until next March

This puts the division in a tough spot: It must either compete with a face-lifted model or be confronted with the obvious disadvantages of a late model introduction.

Only bright spot for the hard pressed company is a $1,050,000 contract for acquisition of tools and machines for production of components for J-57 jet engines. It will take three to five years to complete this project.

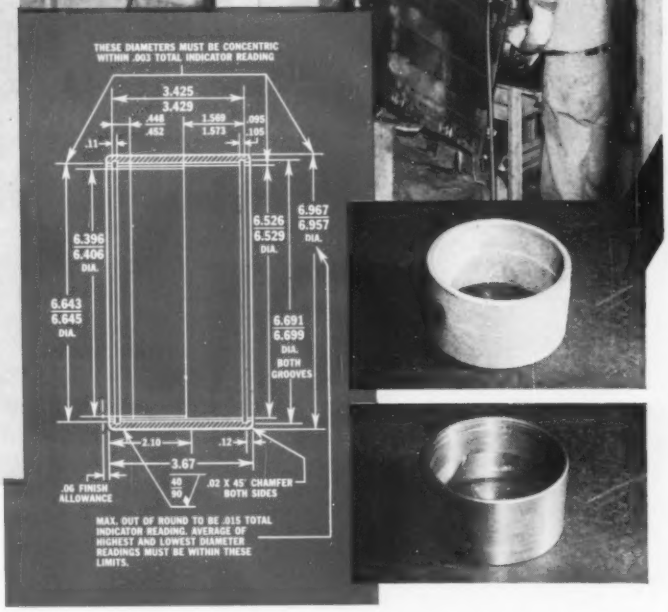
Meanwhile, proposed merger of S-P with Curtiss-Wright may be stalled. At least, time was running out for action between the automaker and aircraft company.

Automobile Manufacturer produces

Repetitive Pieces to Close Tolerances with

BULLARD MULT-AU-MATIC Type "L"

At one of the nation's largest automotive plants, a number of Bullard Mult-Au-Matics, Type "L" are employed to produce automatic transmission parts. According to the Process Engineer "The transmission is the most precision piece of equipment in the entire car — with many moving parts fabricated to close tolerances."



If you have need to manufacture to exacting tolerances it will pay you to investigate the many advantages offered by Bullard Mult-Au-Matic, Type "L".

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James Wood—after the War of 1812—developed a better "planished iron" than existed—and so began Alan Wood Steel. His son developed the first 3-high mill in the country, known as the Conshohocken Mill. Later there came the first 30" hot rolled strip mill in Eastern Pennsylvania—and the first water-treatment plant of its type in the industry—and the first rotary hearth furnace ever used for a plate mill operation—resulting in scores of products, new and improved.
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For detailed information on Alan Wood and its products, write Marketing Division—Department AW-47.

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Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
JUNE 9, 1956	116,109	24,631
JUNE 2, 1956	88,388	19,882
JUNE 11, 1955	145,316	27,478
JUNE 4, 1955	135,990	27,741

*Estimated. Source: *Ward's Reports*

sports cars or strictly prestige automobiles.

In the meantime, Goodyear is just starting production of the tire. It will be available first only in scattered areas of the country but the company plans on national distribution by the end of the year. It will be priced around $60.

Development of similar tires for trucks and buses will not come until a later date.

Isotopes Aid Autos

Ford Motor Company's use of radioactive isotopes in the manufacture of automobiles was pointed out at the recent meeting of the Society of Automotive Engineers in Atlantic City, N. J.

In a paper presented at the session, it was pointed out that Ford first began using isotopes as early as 1934. Bigger applications did not develop until after World War II.

Today, the company has an extensive laboratory for using and testing radioactive materials.

The radioactive technique is used to check the distribution of additives in foundry operations. They are also being used to measure pipe and wall thicknesses in pressure lines and engine blocks and to inspect castings internally.

Recently, Ford installed a Betaray gage which continually measures the thickness of sheet steel as it is rolled on a cold mill and automatically adjusts rollers to compensate for off-specification thickness.

In another case, radiated powdered iron ore was fed into one of the company's blast furnaces. Tracing of the ores indicated that a considerable amount of fine ore was lost and a sintering operation would be required before it could be used effectively.

The paper points out that the nuclear age holds the promise of better and cheaper processes for manufacturing and that the program would be speeded greatly if industry in general was given more access to reactors.

Ford Aluminum Foundry

Ford Motor Co. will soon break ground for its new aluminum foundry in Listerhill, Ala. The company hopes to have the foundry in operation late in 1957.

The new plant will contain more than 200,000 sq ft of floor space and will be used to produce aluminum castings for engine and transmission parts.

The aluminum will be shipped to the foundry from the new Reynolds Metals Co. reduction plant which is adjacent to the Ford property. The metal will be delivered in a molten state and stored in holding furnaces until it is ready to be poured in either permanent mold or die cast operations.

Ford emphasizes the fact that the new installation will not be a sand foundry. About 80 pct of its production will be in precision die castings, which is a close tolerance machine operation.

The company's investment in equipment will be substantially higher than the industry average of $12,500 per employee. Because of the skills required in the foundry, Ford is planning a thorough training program for the people who will eventually work there.

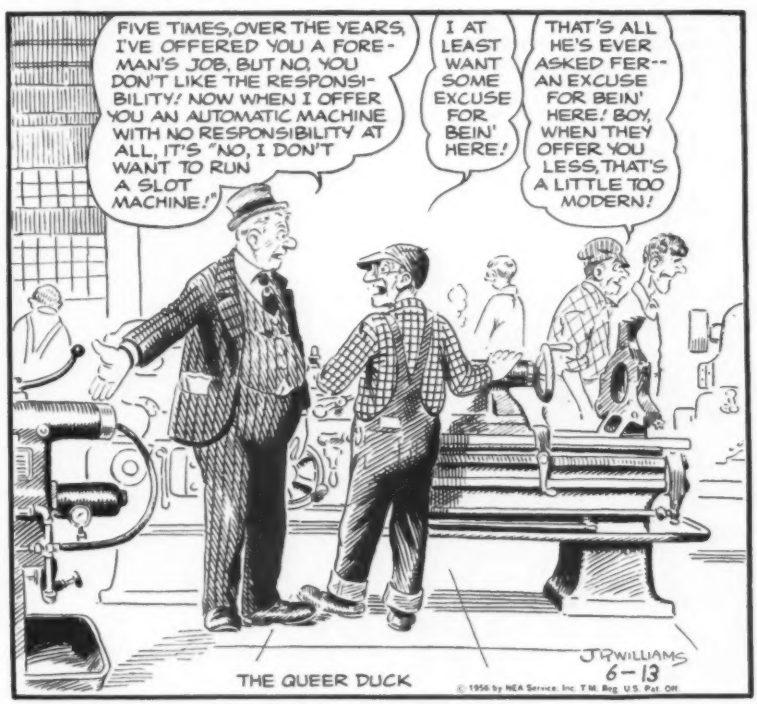
On the Upgrade?

Some signs of a revitalized auto market appear in latest sales reports, although the gap still widens between this year and 1955.

Chevrolet dealers sold 822,729 cars and trucks in the first five months of the year, compared with 823,729 a year ago.

Buick dealer sales jumped in the last 10 days of May, but still were 29 pct below a year ago. Lincoln dealers are a full 26.6 pct ahead of 1955, while Oldsmobile sales jumped 24 pct in the last 10-day period of May as sales picked up.

THE BULL OF THE WOODS — **By J. R. Williams**


FIVE TIMES, OVER THE YEARS, I'VE OFFERED YOU A FOREMAN'S JOB, BUT NO, YOU DON'T LIKE THE RESPONSIBILITY! NOW WHEN I OFFER YOU AN AUTOMATIC MACHINE WITH NO RESPONSIBILITY AT ALL, IT'S "NO, I DON'T WANT TO RUN A SLOT MACHINE!"
I AT LEAST WANT SOME EXCUSE FOR BEIN' HERE!
THAT'S ALL HE'S EVER ASKED FER--AN EXCUSE FOR BEIN' HERE! BOY, WHEN THEY OFFER YOU LESS, THAT'S A LITTLE TOO MODERN!
J.R.WILLIAMS 6-13
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Administration Split on Merger Bill

Indecision has effect of stalling bill's progress . . . Merger notification bill would require 90 days' notice to government of firms planning union . . . Leak possibility major weak point—By G. H. Baker.

◆ FACT that the Eisenhower Administration is sharply divided over the merits—or lack of them—of the so-called "merger notification bill" has stalled the bill's progress to a standstill.

But anti-merger congressmen are confident that a few persuasive words from Ike can easily jar the bill loose and send it speedily down the home stretch within the next week or two.

Under the provisions of the bill (which has been approved by the House, and now is pending in the Senate), firms proposing to merge must give 90 days' notice to the Federal government before attempting to consummate any proposed mergers. Upon receiving notice, the government would then seek to enjoin the proposed merger until it examined the proposal and gave a yes or no answer.

All Don't Agree . . . President Eisenhower's business experts have been unable to agree among themselves as to whether or not such a law would produce a hardening of the arteries of normal business growth. The Justice Dept. and the Federal Trade Commission claim such a law is needed to prevent small firms from being gobbled up by their larger competitors. The U. S. Commerce Dept., on the other hand, points out that some mergers, far from lessening competition, actually encourage competition. (Example: Studebaker-Packard merger prevented the collapse of these firms individually.)

In addition, you can find business experts in the ranks of both political parties who'll tell you that the government has plenty of antitrust laws on the books today—perhaps more than it needs—but the weakness is the timidity of both Republican and Democratic Administrations in enforcing them. These experts will tell you that the present Assistant Attorney General for antitrust matters—Judge Stanley Barnes—has showed more political guts than any antitrust boss in Washington for 30 years. He has filed more cases, got more "wins" in court, than any predecessor ever dreamed of.

Good or Bad? . . . Will a law to block mergers stunt normal business growth? Here are some questions on the proposed merger law that are now being asked in Senate cloakroom circles:

Will such a law require the government to keep confidential the information concerning proposed mergers submitted to it?

Would not such information (a gold mine to snooping competitors) leak out anyway during the 90-day waiting period?

Would not this danger of "leaks" make firms reluctant to apply for permission to merge, thereby killing off "good" mergers as well as "bad" mergers?

Leaks Probable . . . Great masses of data would have to be screened by the government before giving a "yes" or a "no" answer to each proposed merger. This means the government would necessarily have to take a long time to examine each question, and this increases the likelihood that there will be leaks of competitive infor-

It's Good News for Third Quarter

- **Sec. of Commerce Sinclair Weeks predicts that third quarter business spending will pick up by an annual rate of $2 billion for plants and equipment.**
- **Rate for the second quarter is running at about $34,800,000,000, will jump to a rate of $36,700,000,000. Actual spending for the first quarter was at a rate of $32,000,000,000.**
- **This rate would bring capital spending to almost one-fourth more than for the corresponding quarter of 1955. For railroad and manufacturing industries, rates are one-half to one-third better, respectively.**
- **Other optimistic notes: Employment climbed to 65 million in May, a record for the month, close to the all-time high of 65.5 million in August last year.**

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mation dealing with manufacturing costs.

In every case seeking merger approval, the first thing the government would do would be to seek a temporary injunction blocking the proposed merger. This would harm the competitive position of the companies involved, and could seriously depress the value of stock and earnings. A company in need of cash could starve while waiting for the government to say yes or no.

Acme Settles

Acme Steel Co., Chicago, and the Justice Dept. have reached agreement on reduction of excessive profits claims against Acme under the Renegotiation Act.

The government's claims against Acme in the amount of $6,220,000 were settled for $4,900,000. Claims involved excessive profits returnable to the government for the years 1942-45 inclusive.

Acme, a leading producer of steel strapping, filed petitions in the U. S. Tax court contending that the Renegotiation Board made errors in determining the amount of sales subject to the act and the amount of profit that was excessive. The case, one of the largest and most complicated of all those arising under the Act, has been the subject of negotiations lasting several years.

Labor Decisions:

Courts rule on violence, uphold Red firing.

State court decisions barring hoodlumism in labor disputes and guaranteeing industry the right to keep Communists off its payrolls are endorsed by the U. S. Supreme Court.

In separate actions, the high tribunal upholds a ruling of the Wisconsin Supreme Court on the first issue and the California Supreme Court on the second.

Kohler Action

Supreme Court backing of the Wisconsin ruling recognizes the paramount concern of the states in protecting the public and business from the dangers of mass picketing, employee coercion, and violence. States may act to prevent these dangers, say the courts, even though the National Labor Relations Board has authority to halt unfair labor practices.

A 1954 strike at the Kohler Co. plant at Kohler, Wis., involving the United Auto Workers Union, started the events that led to court review in Washington. The union, charged with blocking public roads and using force and threats against non-strikers, did not follow a state employment relations board order to desist.

In its decision, the court holds that NLRB jurisdiction is not exclusive in such cases. Majority opinion describes the states as the "natural guardians of the public against violence."

Firing Holds Up

The court dismisses an appeal from a California high court decision that Cutter Laboratories does not have to rehire an employee fired because of Communist party membership. Cutter, a producer of antibiotics and other drugs sales items, had discharged a clerk-typist who was found to have concealed the fact that she was a Red.

An arbitration board, on complaint of her union, ordered the employee reinstated with back pay. However, the state supreme court found that the public interest would not be served by a Communist working for a producer of antibiotics.

"Don't you have to laugh when you think of all those guys stuck with oil wells and coal mines?

Ike Nudges Labor

President Eisenhower pitches a gentle but firm reminder to labor leaders that they hold office to serve union members, not to dominate them.

While a host of assembled union chiefs mulled this remark, Mr. Eisenhower went on to observe that labor, like government, must learn to bear equal responsibility for service to the people, and must be constantly watchful to safeguard the freedom and the security of individuals.

Ike's remarks were delivered during ceremonies marking the opening of the shining new AFL-CIO building in Washington.

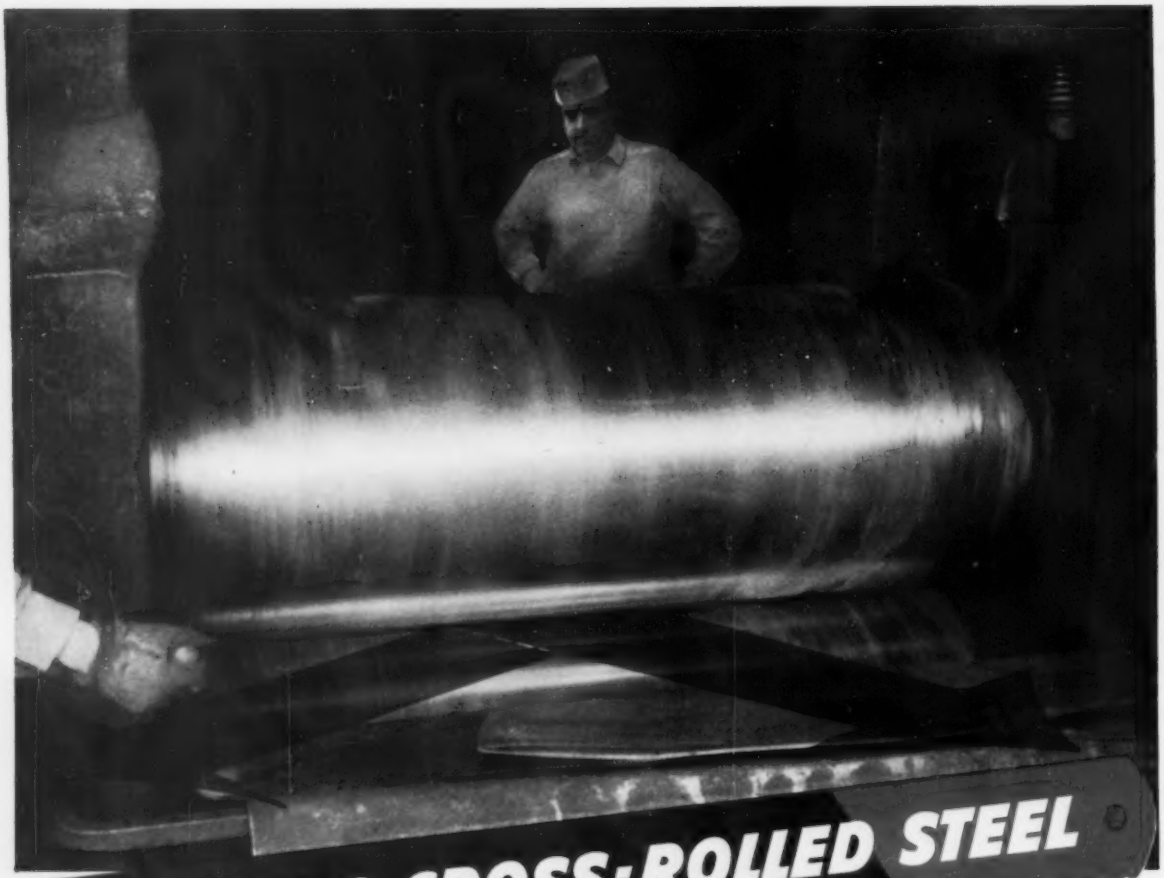
Revive Liberty Ships?

Commercial ship operators will be afforded greater opportunities to try out powerful new engines in government-owned Liberty ships if Congress heeds the urgings of the U. S. Maritime Administration.

Walter C. Ford, Deputy Maritime Administrator, asks the House Merchant Marine Committee to give his agency broader authority in contracting for tests of commercial possibilities of the World War II vessels. Most of the comparatively slow Liberties remain idle in the reserve fleet.

Maritime Administration has let contracts for the installation of four power plants of different types in four of the ships. The agency endorses a new bill that would expand its powers to arrange with private operators for extensive operational tests.

A second bill with Maritime Administration backing would allow the agency to work closely with public and private organizations in developing improved vessel and port equipment designs.



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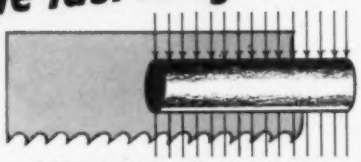
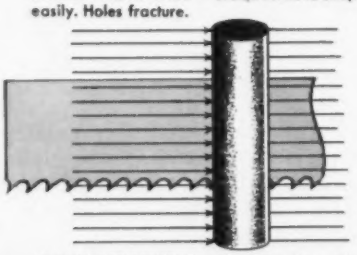
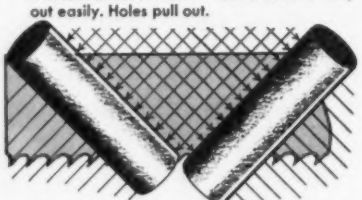


ROLLED WIDTH-WISE — Blade tends to snap easily. Holes fracture.



ROLLED LENGTHWISE — Teeth tend to strip out easily. Holes pull out.



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What's New in Planemakers' Methods?

Hand-sized TV sets check landing gear . . . "Pressure cooker" performs metal bonding . . . Leak detector insures perfect sealing . . . These and other tools of planemakers can also be useful in metalworking—By *R. R. Kay.*

◆ AIRCRAFT INDUSTRY techniques and products can be your happy-hunting-ground if you're looking for new ideas and ways to cut costs. Examples? Here are a few of the latest production wrinkles used by West Coast plane producers.

Industrial TV may be your answer for looking into hard-to-get-at and unsafe places.

Engineers at Lockheed Aircraft Corp. have developed a rugged 1½-lb television camera, easily held in the palm of your hand. It's only 1¾ in. x 2 in. x 5 in. Mounted outside a plane, the tiny camera sends a picture to a receiving set inside the plane. Observer can watch moving plane parts, such as landing gears, in operation.

Other applications could be microscopic televiewing of metal grid samples to show metal stretch patterns, and optical tooling.

Putting On Pressure . . . A Gargantuan-sized version of your wife's kitchen pressure cooker helps turn parts out faster at Boeing Airplane Co. The cooker is a cylinder 9 feet in diameter and 27 feet long. It's for bonding metal parts at temperatures up to 350°F and at pressures 10 times those of sea-level atmosphere.

Boeing engineers say it makes a better bond than you get by riveting or bolting—and without the weight of extra metal.

The complete autoclave unit includes: cooker, a traveling elevator which carries parts to and from it, a battery of vacuum pumps, and oil heaters. Cooker's shell is ⅞ in. thick. Steel door weighs 7½ tons. This electrically-operated equipment uses a control panel with special instruments for "watching" what goes on inside.

Chemical milling, a precision etching process successfully used on aluminum aircraft parts, is now in use on steel, titanium, and magnesium. Turco Products, Inc. is doing the work.

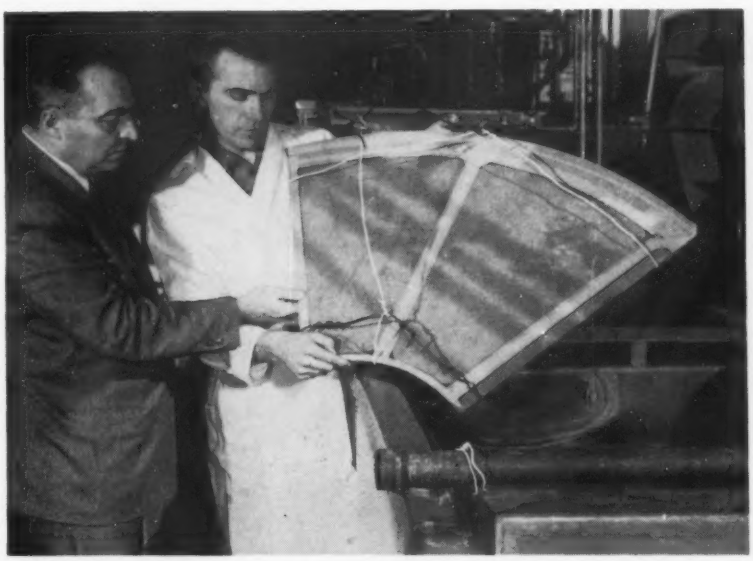
Sherlocking Leaks . . . Does your product depend on a perfect seal? There's a new portable leak detector made here which tests evacuated or pressurized systems. It's a low-cost, easily-operated instrument for production line use.

Applications include testing hermetically sealed parts, refrigeration units, high-vacuum systems, drums and other containers.

Are you overlooking casting as a cheaper way to do difficult precision work?

One planemaker found worthwhile savings when he went from a welded aluminum structure to an aluminum casting for his wing jig end gates. And the castings are probably some of the largest ever tried.

Good Casting . . . Company engineers report aluminum castings are more economical, faster to manufacture, more stable for jig use. In addition you can use scrap aluminum.



MANUEL C. SANZ, inventor of North American Aviation's patented process for precision etching of steel and titanium, examines part held by John Derbyshire Jr., at Turco Products, Inc., pilot plant in Los Angeles.

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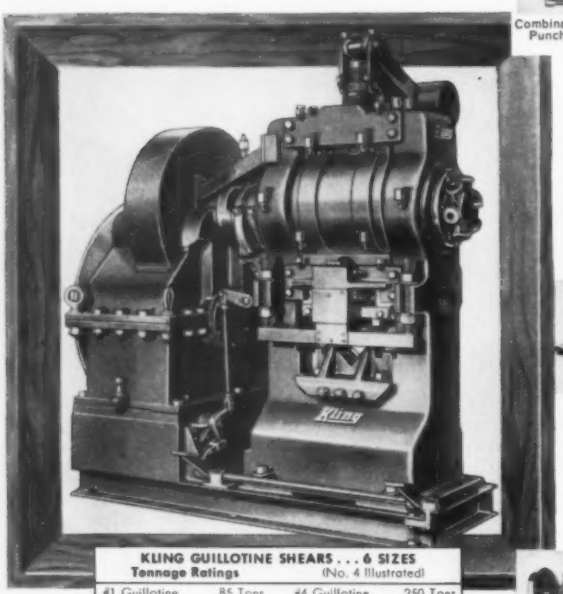
Combination Shear, Punch & Coper

. . . "Production Oscars" in many plants



KLING GUILLOTINE SHEARS . . . 6 SIZES

Tonnage Ratings		(No. 4 Illustrated)	
#1 Guillotine	85 Tons	#4 Guillotine	250 Tons
#2 Guillotine	125 Tons	#5 Guillotine	450 Tons
#3 Guillotine	175 Tons	#6 Guillotine	650 Tons

Beam and Column Millers

Bulldozers

Down-Stroke Friction Saws

Horizontal Stroke Friction Saws

Hydraulic Power Units for Friction Saws

Universal Punches

We are constantly adding new features to the various models of Kling Shears, so that you should be able to get even better performance than the remarkable reports like these that we receive from Kling Users. "Labor costs cut 75%," says a Chicago manufacturer and a famous company reports, "We now get 16 hours work from an 8-hour shift." Ask for descriptive bulletins on the particular model of shears in which you are interested.

Angle Bending Rolls

Plate Bending Rolls

other KLING metal-working machines that are cutting costs and speeding production

If your operations include such jobs as cutting, punching and shearing beams, channels or angles . . . shearing round or flat bars . . . rolling structural shapes . . . performing special operations such as flanging, slitting or coping . . . or milling beams and columns . . . it will pay you to send for Kling Bulletin 100. This "condensed catalog" gives full details on machines* shown here, that do these jobs faster, better and at lower cost.

**Ask for special Bulletin if interested in MILL-ALL Beam and Column Miller*

Since 1892

Kling

Active Kling Distributors cover practically every marketing area of U.S. and Canada. Write us for name of one nearest you.

BROS. ENGINEERING WORKS

1320 N. KOSTNER AVE. • CHICAGO 51, ILLINOIS

Makers of Friction Saws; Shears—Rotary, Double-Angle and Guillotine; Punches; Combination Shear, Punch and Coper; Angle and Plate Bending Rolls; Bulldozers.

Export Distributor: Simmons Machine Tool Corp., 50 E. 42nd St., New York 17, New York

Canadian Distributor: Brown-Boggs Fdry. & Machine Co., Hamilton, Ontario

1403

MACHINE TOOL HIGH SPOTS

New Standards for Rating Gear Strength?

AGMA takes initial step at annual meeting as stress and load formula is presented . . . Various committees will now develop other ratings . . . Meeting points out role of gearing in flight control—By *E. J. Egan, Jr.*

◆ A PROPOSED, but tentative standard for rating the strength of gear teeth was presented to members of the American Gear Manufacturers' Assn. last week. Occasion was the Assn.'s 40th Annual Meeting at Hot Springs, Va.

New basic formula is the result of countless hours of work by AGMA's Gear Rating Coordinating Committee. Job was to boil down, to a fundamental equation, the best of more than 60 years' of industry progress in gear strength calculations, stemming from millions of dollars' worth of laboratory and field investigations. Starting point was the "Lewis formula," introduced before the turn of the century, for computing the tooth bending stress and load carrying capacity of gearing.

Marks A Beginning . . . Although the new formula might be classed as an "end unto itself," it is just a stepping stone for what AGMA members hope will be more rapid progress in other areas. Specifically, next job will be development of coordinated standards for the rating of spur, helical, bevel and worm gears.

Separate "rating" committees for the various gear types will undertake these jobs. With the new basic formula to work from, expectation is that their work will go rapidly. Their recommendations for individual rating standards will be published in one master standard.

In another convention session, members heard that "gear engineering poses one of the great problems facing the aviation industry today." This opinion was offered by R. W. Weber, assistant design group engineer for Convair Div., General Dynamics Corp.

Gears to the Rescue . . . Mr. Weber pointed out that as aircraft speeds increase to supersonic levels it becomes difficult to control performance with present methods. Tremendous forces involved in supersonic flight require that control be accomplished with minute movements of control surfaces.

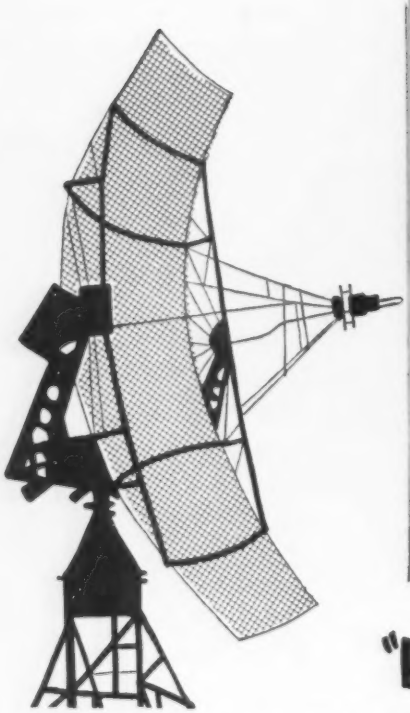
Expectation is that gearing will provide much of this "assistance." But it will take "gears that not only transmit force, but also accurately measure angular position, operate without backlash at high temperature with no lubrication, and under conditions of high vibration and shock loads."

Must Be Better . . . Precision flight control is more and more a matter of intricate computations, quickly performed. Mr. Weber said, "Final data from these computing systems is completely dependent on the linear quality of the electronic and mechanical components. In the near future there will be electronic components with greatly reduced linear errors."

NEW GEAR ASSN. OFFICERS

NEW OFFICERS of the American Gear Manufacturers' Assn. are, l to r, G. E. Gunderson, president; L. R. Brooks, vice president; T. A. Jones, treasurer; H. A. James, J. F. Murray, R. M. Honneger, C. F. Bannan and C. L. Kessler, executive committeemen. They were elected at the 40th annual meeting of the AMGA last week at Hot Springs, Va.

EIMAC electron-power tube components machined and formed from Bridgeport High I.Q.* Alloys by Eitel-McCullough, Inc., San Bruno, California.



"Heart" of a RADAR system...

Depends on BRIDGEPORT HIGH I. Q.* ALLOYS

RADAR (for RAdio Detection And Ranging) is the invisible 24-hour sentry that guards the borders of North America. Day and night, a far-flung network of radar ground stations and interceptor squadrons tracks and identifies all approaching aircraft.

Heart of a radar system is the electron tube which transmits and receives microwave signals. And Bridgeport is a major supplier of oxygen-free copper alloys used in electron-power tubes.

Tubes using Bridgeport alloys are also important in the transmission of commercial television and FM broadcasting, navigation systems for civil and military aircraft, and many other electronic uses.

Production of electron-power tubes is only one example of how top efficiency is obtained when Bridgeport matches the metal to the job. Whatever your production requirements, Bridgeport's Technical Service and laboratories are always ready to assist you in material specifications. For high-quality brass and other copper alloys—alloys matched to your job—write or phone your nearest Bridgeport Sales Office.

Bridgeport's COPPER ALLOY BULLETIN contains helpful, up-to-the-minute information on metals and metal working. Are you receiving it regularly? If not, write and request your copy.

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Bridgeport Brass Company, Bridgeport 2, Connecticut • In Canada: Noranda Copper and Brass Limited, Montreal

The Iron Age SALUTES

Lawrence F. Williams As president of Cooper-Bessemer Corp., his business philosophy has done much toward developing better men, better machinery. He seeks answers to production problems personally in the shop or field.

One of the most lonesome places in Mount Vernon, O., is Lawrence F. Williams' office at Cooper-Bessemer Corp. Mr. Williams, who is the firm's president, believes there is no place for swivel-chair complacency in a highly competitive field such as the power and compressor industry. He is an executive who rolls up his sleeves and tackles tough problems on the job with his men.

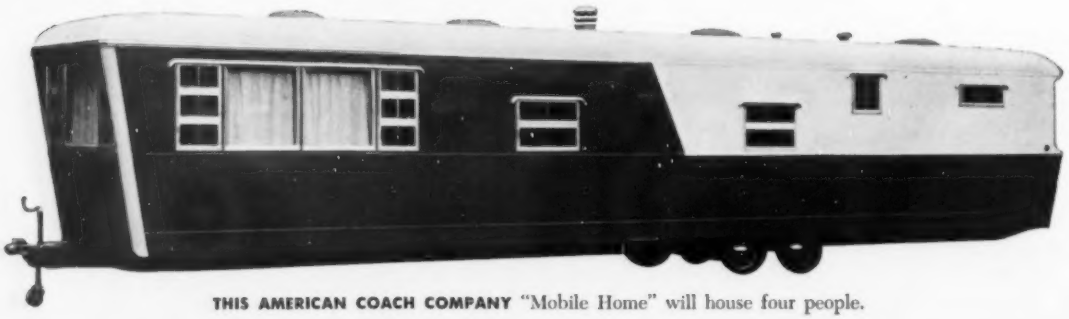
Author of a well-defined business philosophy, Mr. Williams claims that the key to industrial accomplishment is to be found in materials and men. He is known for his ability to mold both into better end products. By his own contagious enthusiasm, he boosts the confidence factor of the men around him as he does with metals. He has perfected a unique formula for balancing the human equation in business.

A graduate of Oberlin College, Mr. Williams began his industrial career as a lathe operator. But he claims to be a foundryman at heart. He soon left the machine shop for the more fundamental challenge of the foundry. In a quarter of a century with Cooper-Bessemer, he has directed the industry's efforts to raise the confidence factor of cast materials, contributed to the development of high-strength irons and improved the design of industrial air compressors used in the manufacture and transmission of gas. When the newest nodular irons were introduced, he undertook the first license awarded to an engine-compressor builder to produce nodular iron castings commercially.

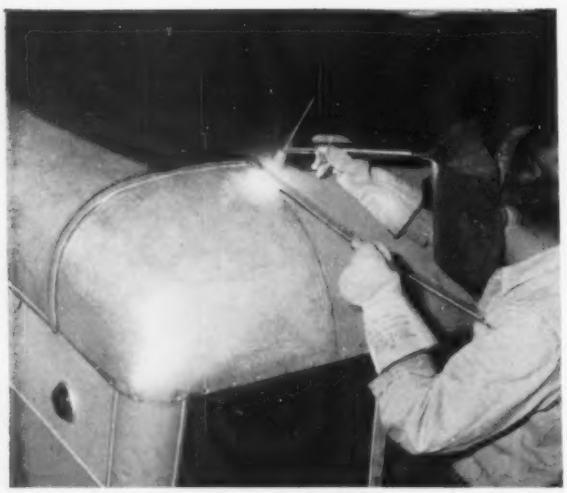
Perhaps no other man knows and understands the problems of Cooper-Bessemer in its industry as does Mr. Williams. In his quarter century of service he has called signals for every phase of the company's operations, inside and out. As a seasoned coach who knows his men, Bill Williams calls the plays skillfully, leading his industrial team to greater accomplishment. For an executive whose personal contact with employees is so close, it is no wonder his office is the least likely place to find him.

One operator completes 200 feet of welds a day

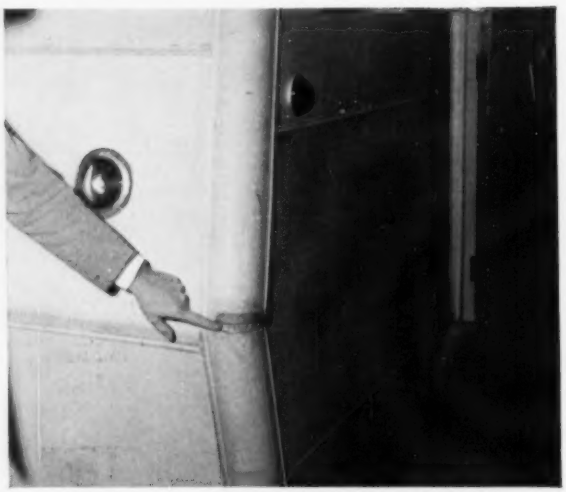
Fast Braze Welding with smooth-flowing Everdur*-1010 Welding Rod makes sleek, tight roofs for American Coach Co. "Mobile Homes"



THIS AMERICAN COACH COMPANY "Mobile Home" will house four people.



Braze welding a roof corner on 19-gage zinc-coated steel. One operator welds, grinds and prime-coats 200 linear feet of joints in a day.



Rear wall corner of 24-gage zinc-coated steel, also braze welded. The 22 corner sections needed for a day's production are completed in one hour.

Eleven big "Mobile Homes" a day come off the production lines of American Coach Company, Cassopolis, Michigan, and Newton, Kansas. On the roof of each, four corner segments are braze welded by the inert-gas tungsten-arc method, using filler rod of Everdur-1010, one of Anaconda's well-known copper-silicon alloys. Two rear corner posts are also braze welded in the same way.

"We prefer Everdur rod," says M. E. Wickersham, vice-president in charge of engineering and production for American Coach Company, "because it flows easily and enables our operator to weld rapidly—and because the welds are resistant to corrosion at these critical points. High welding speed means a minimum total heat input and, therefore, the least distortion in the metal and the least effect on the galvanizing."

Besides helping to make smooth and strong roofs, these Everdur braze welds help to keep them waterproof, for Everdur is nonrusting and highly resistant to many types of corrosion.

Everdur-1010 is one of nine Anaconda Welding Rods finding ever-increasing application in production and repair work. Anaconda Welding Rods are available from distributors throughout the United States and Canada. For help in selecting rod, see your distributor or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 56110

*Reg. U. S. Pat. Off.

ANACONDA® **WELDING RODS**

The Iron Age INTRODUCES

D. B. Benedict, elected president, **Carbide and Carbon Chemicals Co.,** Division of Union Carbide and Carbon Corp., New York.

Harold G. Clayton, elected vice president, manufacturing, **Bay State Abrasive Products Co.,** Westboro, Mass.; **Elden L. Auker,** elected vice president, sales; **Arthur E. Gilman,** named treasurer.

S. J. Moran, elected vice president and general manager, foundry and mill machinery operations, **Blaw-Knox Co.,** Pittsburgh; **E. C. Rook,** elected vice president and general manager, fabricated products operations.

Gordon Kiddoo, elected vice president and general manager, **NRC Metals Corp.,** Cambridge, Mass.

Albert J. Berdis, named general superintendent, South Works, **U. S. Steel Corp.,** Chicago; **E. B. Speer,** named general superintendent, Morrisville, Pa., plant; **J. H. Elliott,** appointed assistant executive vice president, operations, Pittsburgh; **E. H. Gott,** appointed vice president, steel, Pittsburgh; **Oscar Pearson,** named general manager, operations, Pittsburgh.

J. Charles Forand, elected assistant treasurer, **Lamson Corp.,** Syracuse, N. Y.

H. F. McCloy, elected comptroller and secretary, U. S. Steel's **Union Supply Co.,** Pittsburgh.

Following appointments are within the Engineering Dept., **Kaiser Aluminum & Chemical Corp.,** Oakland, Calif.; **B. S. Dalton,** named manager, raw materials engineering; **R. O. Gunderson,** appointed manager, reduction engineering; **David Mayers,** named manager, fabricating engineering; **A. Dean Smith,** appointed manager, advanced engineering design; **Jean A. Hoffman,** named manager, engineering planning.

A. W. Edwards, appointed assistant to vice president, apparatus products, **Westinghouse Electric Corp.,** Pittsburgh.

Ernest G. Enck, named director, planning, **Foote Mineral Co.,** Philadelphia; **William M. Raynor,** named director, purchases; **Walter J. Brooking,** named assistant director, purchases.

Theron T. Chapel, named product control supervisor, **Acheson Colloids Co.,** Port Huron, Mich.; **James S. Crowl,** named supervisor, process research; **Erwin J. Campbell,** named product development supervisor.

Dr. Franklin Johnston, appointed director, research, **Carbide and Carbon Chemicals Co.,** division of Union Carbide and Carbon Corp., New York.

Donald C. Horsman, named plant superintendent, **Continental Steel Corp.,** Kokomo, Ind.

HARRY B. McCLURE, elected vice president, Union Carbide and Carbon Corp., New York.

EARL C. HUGHES, elected executive vice president, Bay State Abrasive Products Co., Westboro, Mass.

GLENN E. SEIDEL, elected vice president, engineering, Minneapolis-Honeywell Regulator Co.

DONALD F. BROOKLAND, elected vice president, operations, Keokuk Electro-Metals Co., Keokuk, Iowa.

MEMO FROM THE PRESIDENT

Phil S. Coffer, President of C & H Supply Co., manufacturers of Metal-Cals

In our competitive economy, manufacturers and distributors constantly strive to improve their products and services. One of the newest improvements in product identification is Metal-Cals. They come in any size or shape with a variety of colors, and can be die cut to any design. America's leading industries are using Metal-Cals...the colorful, original, anodized and dyed, etched .003" aluminum foil. Metal-Cals are faster to apply than decals or name plates and do not require screws, pins, rivets or other fastening devices—they reduce labor and material cost in most applications. Metal-Cals "stick to the job" of trademarking, providing clear, sharp diagrams or serial numbering for operating or maintenance instructions for your products. We would appreciate it if you would send in this coupon so that you may examine Metal-Cals and see why they are industry's most modern and economical method of product identification.

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PAT. PENDING

D. W. Lloyd, named ass't to Chicago district manager, **The Youngstown Sheet and Tube Co.,** East Chicago, Ind.

Charles W. Edmondson, named sales manager, Eastern District, Shakeproof Div., **Illinois Tool Works,** Chicago.

Richard J. Sargeant, named general manager, marketing and distribution, Consumer Products Divisions, **Westinghouse Electric Corp.,** Pittsburgh.

W. O. Binder, named assistant manager, Product and Process Development Dept., **Electro Metallurgical Co.,** Niagara Falls, N. Y.; **E. R. Sauders,** appointed assistant to manager, Product Development Laboratory.

Joseph P. Ossola, appointed assistant to production manager, **Granite City Steel Co.,** Granite City, Ill.

W. F. Driver, named manager, industrial products sales, **Vickers, Inc.,** Detroit.

L. W. Elliott, appointed sales manager, **Griffin Manufacturing Co.,** Erie, Pa.

Angelo J. Perna, named director, engineering, **The Kaydon Engineering Corp.,** Muskegon, Mich.

A. S. Chivers, named general manager, Western Div., **Barry Controls Inc.,** Burbank, Calif.

Herbert G. Dent, appointed director, Plant Engineering Div., **Joseph T. Ryerson & Son, Inc.,** Chicago; **George M. Harding,** appointed director, Operating Controls Div.

Edward C. Williams, Jr., named manager, customer relations, **The Wellman Bronze & Aluminum Co.,** Cleveland.

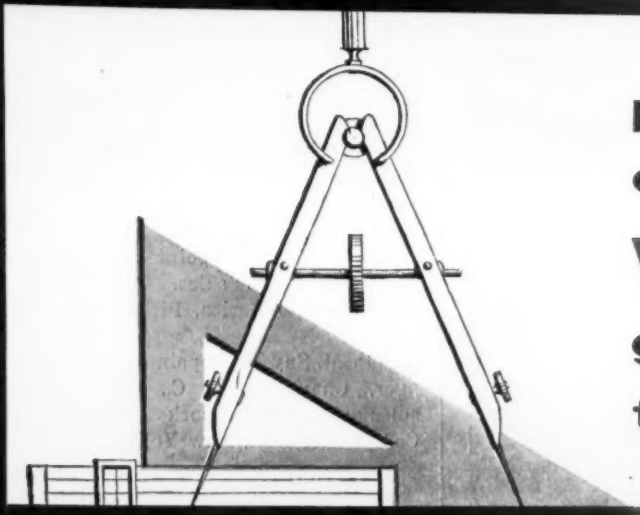
Richard D. Keller, named assistant sales manager, Machine Tool Div., **Pratt & Whitney Co., Inc.,** W. Hartford, Conn.

W. T. McGINNIS, elected vice president, ass't to president and director, Keokuk Electro-Metals Co., Keokuk, Iowa.

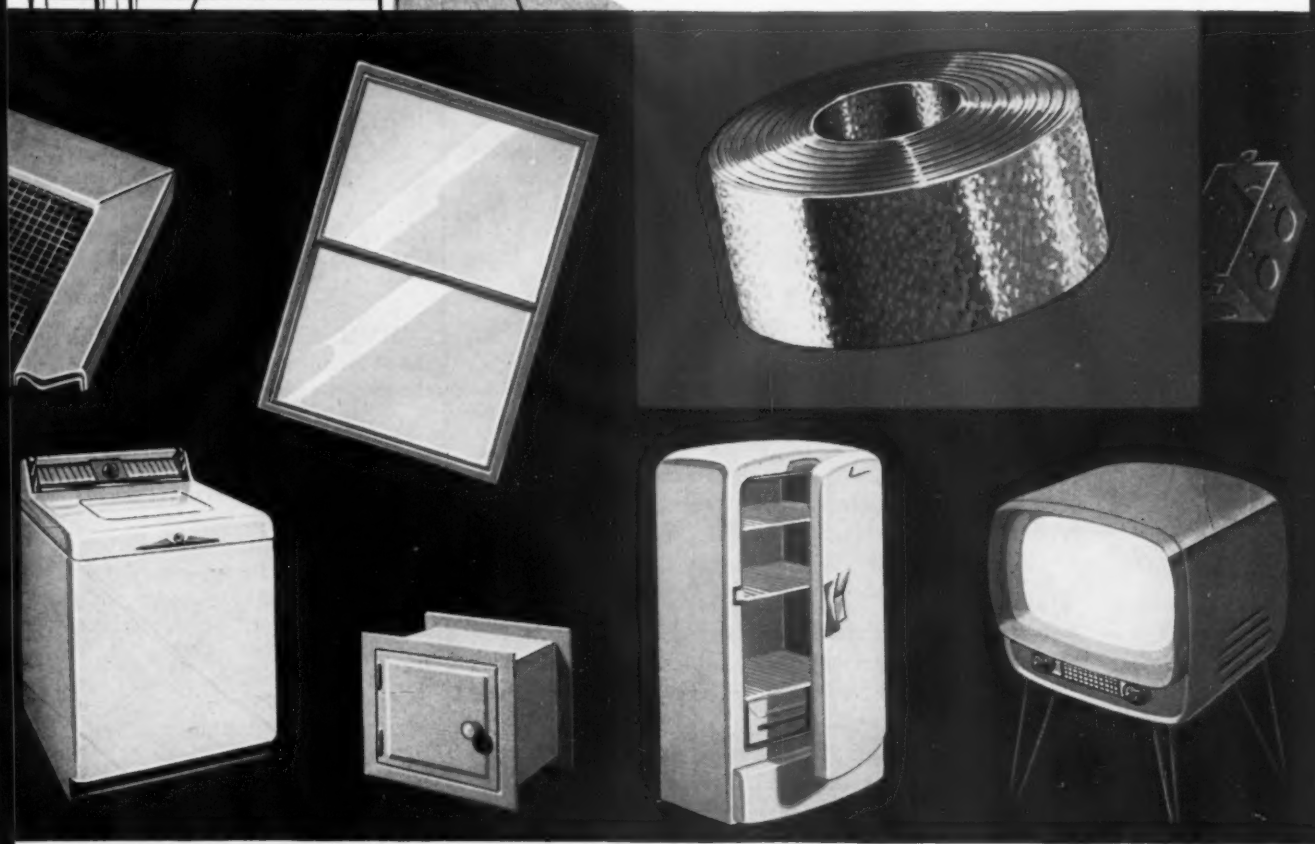
JAY R. STEWART, appointed comptroller, U. S. Steel Products Div., U. S. Steel Corp., New York.

DAVID L. DOTY, appointed ass't chief metallurgist, Aliquippa Works, Jones & Laughlin Steel Corp.

JOHN A. LESCHEN, appointed sales manager, Granite City Steel Corp., Granite City, Ill.



put these bonus advantages of WEIRKOTE galvanized steel to work for you!



For appliances, for other steel products . . . when the job calls for galvanized steel, Weirkote does that job *better.*

Weirkote is made by a special continuous galvanizing process . . . and a tight zinc coating is applied. Result: Weirkote is resistant to peeling, cracking and flaking, even under the severest stresses of fabrication. The coating stays uniform, flows evenly with the base metal, and holds fast under the deepest draws. Amazingly corrosion-resistant, too!

These are just a few of Weirkote's *bonuses* in durability, economy, customer satisfaction. Make it a point to investigate Weirkote from Weirton! Remember: *In the long run, galvanized steel . . . in the LONGER run, WEIRKOTE.*

WEIRTON STEEL COMPANY

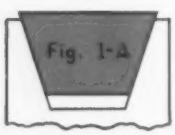
WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION

Concave sides make V-belts last longer

The sides of every Gates V-belt (Fig. 1) are concave—a precisely engineered curve that greatly increases V-belt life. Here's why:



On the bend around the sheave, the concave sides of a Gates V-belt fill out and become straight (Fig. 1-A). Thus the belt makes full contact with the sides of the sheave, grips the sheave evenly, and wear is distributed evenly across the sides of the belt. Uniform wear lengthens belt life; keeps costs down.

Make this simple test

Take a straight-sided belt (Fig. 2) and bend it. Feel the sides at the bend; they bulge out. Now picture this bulge in the sheave groove (Fig. 2-A). It is easy to see that the belt makes uneven contact at points indicated by arrows. Naturally, wear is greater at these points. Uneven wear shortens belt life; increases belt costs.

Cut down-time and V-belt replacement costs. Specify belts that grip evenly and wear longer . . . specify Gates Vulco Rope—the V-belt with concave sides. There is a Gates distributor nearby who will quickly supply the belts you need. The Gates Rubber Co., Denver, Colorado

—World's Largest Maker of V-Belts

TFA 58

Gates VULCO ROPE Drives

PERSONNEL

Everett O. Clark, named manager, midwest branch, **Vickers, Inc.,** Detroit.

A. H. Lewis, appointed manager, tool steel sales, **Crucible Steel Co. of America,** Pittsburgh.

Seth M. Snyder, appointed manager, **Charlotte, N. C.,** district sales office, **The Babcock & Wilcox Co.'s** Boiler Div., New York.

Ray Kozinski, appointed specialty resistor product engineer, Carboloy Dept., **General Electric Co.,** Detroit.

George F. Master, appointed chief engineer, **Allen-Bradley Canada Ltd.,** Galt, Ont., plant.

H. L. Tigges, appointed consulting sales engineer, **Buhr Machine Tool Co.,** Ann Arbor, Mich.

H. N. Muller, Jr., appointed chief engineer, **Canadian Westinghouse Co., Ltd.,** Hamilton, Ont.

Richard H. Kline, appointed to sales staff, Metal Processing Dept., **Pennsylvania Salt Manufacturing Co.,** Philadelphia.

Raymond C. Dryer, named vessel agent, Pittsburgh Steamship Div., **U. S. Steel Corp.,** Duluth, Minn.

Ernest L. Richmond, appointed chief engineer, **Worthington Corp.,** Plainfield, N. J. Div.

OBITUARIES

Fred W. Elya, 65, retired Northeastern district manager, **Norton Co.,** Worcester, Mass.

John L. Slade, 33, administrative assistant to vice president, **The Black & Decker Mfg. Co.,** Towson, Md.

George E. Hallenbeck, retired chairman of the board, **Baker Bros., Inc.,** Toledo, O.

John F. Smith, 55, general manager, **Chevrolet Grey Iron Foundry,** Saginaw, Mich.

See why Tool Engineers call these heavy producers,

"MOST MODERN MACHINES OF THEIR TYPE"

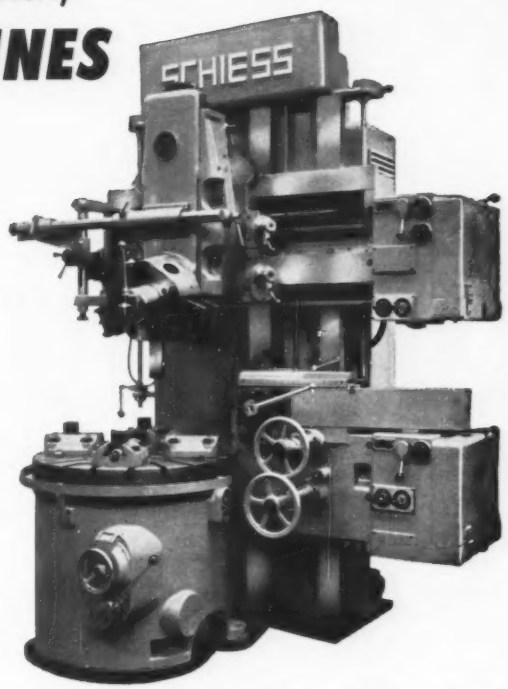
Hydraulic pre-selection of speeds set by handwheel and read on illuminated dial. 16 spindle speeds—ratio 1:50—up to 310 rpm for carbide machining on Model KE 100. Table runs on tapered roller bearings.

Fingertip control for direction of feed and rapid traverse with spring-loaded mono-levers for normal direction plus angular compound feeds. Mono-levers move in same direction as desired feed or traverse movement, simplify correct setting by operator. Specially designed electro-magnetic disc clutches disengage feed instantly with no over-riding or coasting.

Counterbalanced cross rail and side head. Single lever unlocks, raises or lowers, and locks cross rail simultaneously by electro-mechanical controls. *No bolts or nuts to loosen or tighten by hand.*

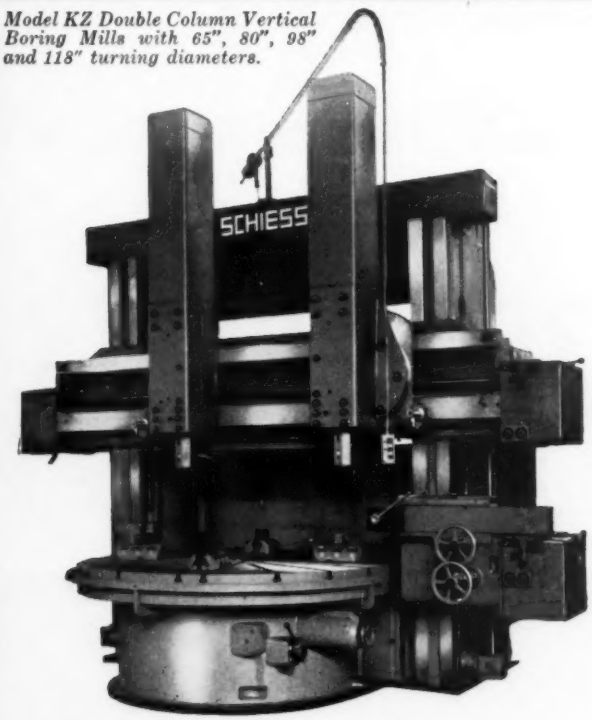
Magnetic dry particle clutch provides vibration-free drive for smooth surface finish. Power is transmitted via belt to clutch from main motor mounted on left side of machine. Instantaneous braking is assured by magnetic dry disc brake.

Copying attachment with electric tracer for use on cross rail or side head.



Model KE Single Column Vertical Turret Lathes with 40", 50" and 65" turning diameters for high-speed carbide machining.

Model KZ Double Column Vertical Boring Mills with 65", 80", 98" and 118" turning diameters.



All operating features of KE Series Vertical Turret Lathes are combined in

SCHIESS KZ DOUBLE COLUMN VERTICAL BORING MILLS, PLUS—

Heads equipped with steel octagon rams can be swiveled—have automatic feed in vertical, horizontal and angular direction and are independent of one another as to amounts and direction of feed. Table operated by three-button pendant control. Standard model KZ Double Column Vertical Boring Mills are available with 65", 80", 98" and 118" turning diameters.

Get to know these products of Europe's largest builder of heavy machine tools. Parts and service are as close as Pittsburgh. An American Schiess engineer will be happy to help you size up these heavy producers for your heavy production needs. Write for catalogs and complete specifications on these and all Schiess KE machines.

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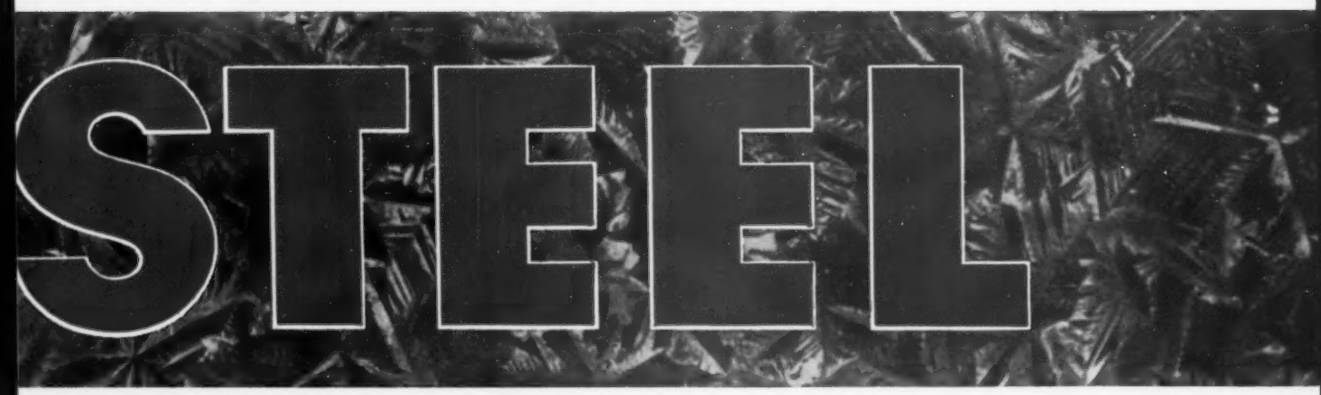
J.L GALVANIZED SHEETS

to safeguard the quality of your work

for galvanized sheets



Now sheet metal users can look to a new, dependable source of galvanized sheets. Jones & Laughlin Steel Corporation is putting more than 100 years of steelmaking experience behind its new facilities for the production of high grade galvanized sheets.

New J&L Galvanized Sheets carry on the J&L reputation for quality steel. Produced with uniform ductility, flatness, and surface finish, they are typical of J&L ability to produce to exacting specifications accurately and faithfully.

Galvanized by the proven Sendzimir process, J&L Galvanized Sheets have a tight uniform coating that resists cracking and flaking, even during severe forming and drawing operations.

J&L Galvanized Sheets are produced with a high-lustre finish that creates eye appeal and customer acceptance for your finished products.

The next time you order, remember—J&L Galvanized Sheets are available in both coils and cut lengths to fit your continuous operations. They work up easily—can be formed, rolled, drawn and cut to your satisfaction.

Available in a range of gages and widths to meet your requirements. Get complete details today.

J&L STEEL

Jones & Laughlin

STEEL CORPORATION · PITTSBURGH

JONES & LAUGHLIN STEEL CORPORATION
403 Gateway Center, Pittsburgh, Pa.

☐ Please send me more information on J&L Galvanized Sheets.
☐ Have your representative call.

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Why Allis-Chalmers Cooling Coil Design Means...

Better Rectifier Operation

More Efficient Heat Transfer results from internal cooling coil. The steel coil surrounds active parts, offering more cooling surface and better heat transfer than other types. Unit maintains more uniform temperature and mercury vapor pressure.

Simplified Maintenance results from Allis-Chalmers unique unit construction. All active components are attached to the anode plate for easy withdrawal, dismantling, and re-assembling — as illustrated above.

Positive Arc Barrier is formed by the cooling coil, which is insulated from the tank. The main arc is confined within the coil, preventing arc transfer to the tank.

Years of Operation in hundreds of installations have proved the reliability, ease of operation, and simplified maintenance of Allis-Chalmers mercury arc rectifiers. You can get complete information at your nearby A-C office, or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

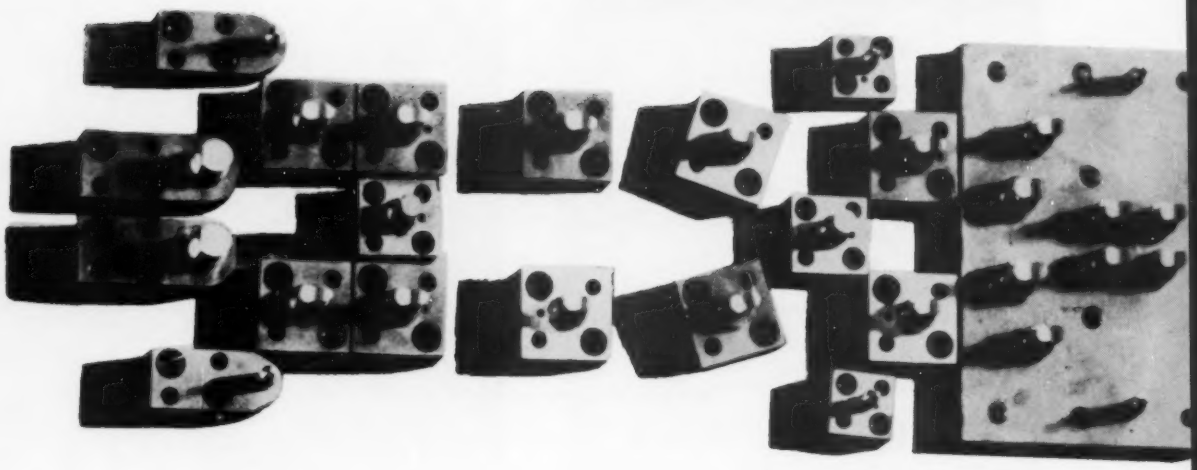
LIVE BETTER ELECTRICALLY

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-5084

FEATURE ARTICLES



Solves die problems—

Tryout Press Puts Squeeze On Downtime

◆ A single 150-ton hydraulic press solves the problem of production die tryout—without interfering with production . . . By holding shop downtime to a minimum, it has more than paid for itself in a year.

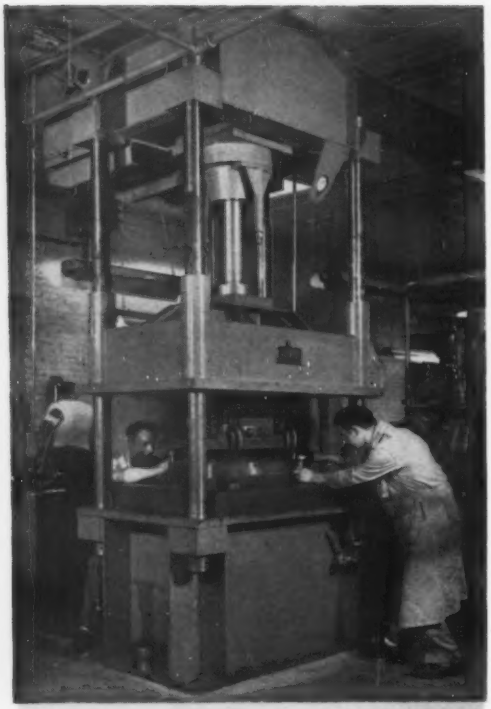
◆ Versatile, this press can handle dies up to 72 in. long, 30 in. wide—including progressive and deep-drawing dies . . . Here's a positive approach to solving die problem wrinkles without snarling productive efficiency.

By W. G. PATTON, Engineering Editor

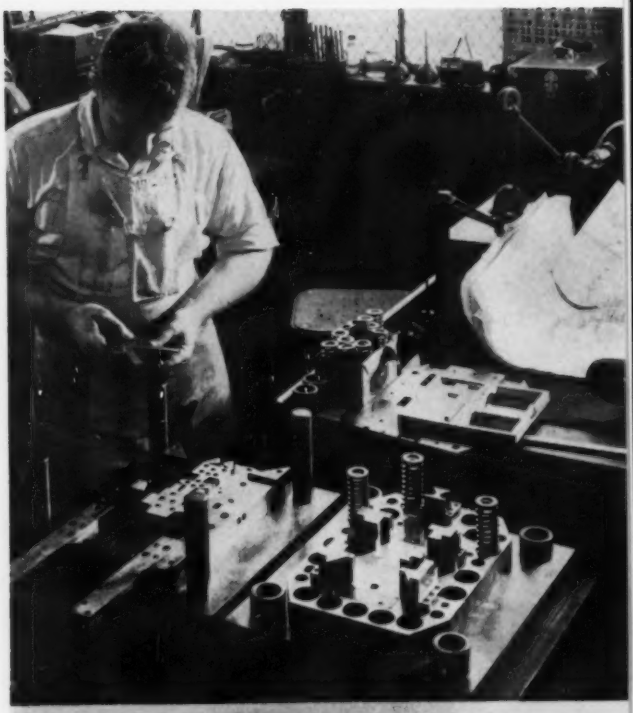
◆ DIE TRYOUT is an essential for most die jobbing shops. It is the "acid test" that either proves or rejects a die before it is placed in production. Major drawback is frequently the lack of press facilities needed to do the job.

A specialist in making deep-drawing dies, Three Star Mfg. Co., Chicago, has licked this problem with a light hydraulic press that checks all dies before delivery to the customer. This 150-ton Dake press is able to handle dies up to 72 in. long and 30 in. wide. Equipped with a standard air cushion, the press can draw up to 10 in. on sheet thicknesses up to ⅛ in.

The Dake hydraulic press does not duplicate



THIS 150-ton hydraulic Dake press handles dies up to 72 in. long and 30 in. wide for tryout.



DIEMAKER carefully checks critical points of new die before tryout tests in Dake press.

the action of the typical mechanical press used in a stamping production line. But it serves to show up quickly any fundamental errors in die design. It not only avoids production binds by eliminating shop testing, but also contributes to the development of blank design aimed at the conservation of steel.

The accompanying illustration shows a coffee maker for which all dies were developed and test run on a Dake press. Made of stainless steel, the end product involves a total of seven press operations. All dies were initially designed and checked out at the Three Star die shop. Pretesting made it possible to set up these dies in a production line within a few days after their delivery. This represents a minimum of lost production time.

Tryout progressive dies

In another typical case, an automotive firm required a set of dies for a certain stamped part. Several press operations were involved. Three Star's die engineers suggested that one of these operations could be eliminated. After designing the new dies, they proved them on the Dake tryout press. Change in die design for this part succeeded in eliminating one die operation—and saved more than a million needless press strokes.

In addition to drawing and forming dies, progressive die designs can also be tried out on the Dake press. A typical example is shown in one of the accompanying illustrations. Both large and small progressive dies—some of them highly complex—have been proved in the tryout press prior to delivery to the customer.

Normally, the stamping industry handles its die tryout problems in several ways:

(1) Dies are tried out in the die shop, necessary corrections are made, and the finished dies are delivered to the customer ready for immediate operation.

(2) Finished dies are delivered to the customer's plant for final tryout in the production line.

(3) For tryout purposes, a press is rented in a nearby plant. Assuming that a suitable press can be found, rental charges may be as high as $25 per hour.

(4) The customer permits die shop personnel to try out dies on his presses.

Whichever method is used, a hydraulic tryout press equipped with an air cushion may still produce significant savings for the tool purchaser.

Principal functions of the Dake tryout press include:

(1) Determining the shape of blanks, length of bends, shape and depth of draws, and proving

other development work that may be required.

(2) Testing the finished die for soundness of design, quality, accuracy of workmanship, and its overall ability to perform.

(3) Making sample parts, as required for inspection and approval of the customer.

(4) Assembling and disassembling press-fit components requiring high pressures.

(5) Making short production runs of stampings.

(6) Making experimental stampings with temporary dies.

(7) Separating dies that have remained in storage for a long time.

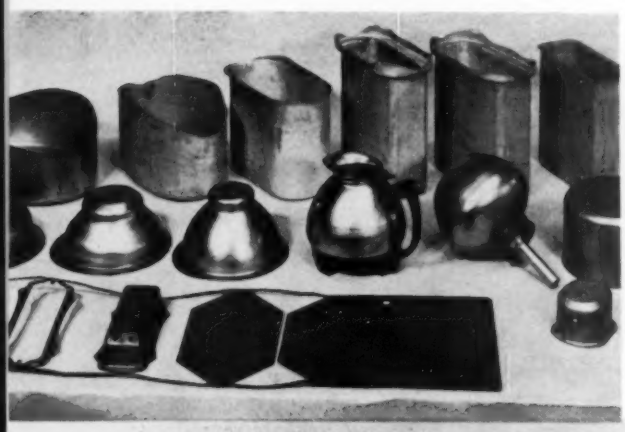
(8) Shearing, assembling, and aligning punches and dies.

(9) Spotting in irregularly shaped male and female forming and drawing dies.

(10) Broaching holes in dies.

(11) Eliminating the need for elaborate tryout when the die is delivered to the customer's plant.

Three Star Mfg. also has a 60-ton, hand-operated screw press for die tryout. However, use of the screw press is limited to small dies that do not require high pressures. Moreover, movement of the slide tends to be jerky and uneven. Several blows are usually necessary to close a bottoming-type die. Thus, a true picture of what is happening to the blank in the press is often obscured. The fact that springs or rubber cushions must be used under the die to provide pressure for the draw rings is a further limitation of the screw press.



COFFEE MAKER and other appliance components illustrate typical deep drawing applications.

Similarly, large mechanical presses have certain disadvantages when they are used for die tryout. Often a press costing several times as much as a Dake press is used for the job. It may be difficult if not impossible to "inch" the slide downward or to reverse at any point in the stroke to examine the work. If by mistake or miscalculation, the die is fully closed on the first stroke, the die or the press may break.

Considerable time is generally required to adjust a mechanical press for die tryout. Also, the speed of the press may be too fast for many tryout jobs such as shaving, sizing and ironing, necking, drawing, expanding and bulging, swaging and coining.

Also, when the work starts high above the bottom of the stroke, as in drawing, a mechanical press with a much higher capacity than a hydraulic press may be required.

An advantage of a hydraulic tryout press that is appreciated more and more by die shops is ability to use a finish on the die which will produce a satisfactory part. Where the die is delivered to the customer for tryout, many unnecessary manhours may be put into the die simply to improve its appearance. Availability of a tryout press checks the parts produced—as well as the adequacy of the finish of the die. Moreover, if additional work is required on the die after tryout, much of this earlier polishing effort may be entirely wasted.

As Three Star Mfg. Co. executives see it, the fact that their diemakers spend most of their time in familiar surroundings may also result in better quality work on dies. Also, dies that require extensive re-working after delivery to the customer may be "suspect" as long as they remain in service. Without pressure for production, it has been observed that diemakers, being human, will do a better job.

Dies set easily

The Dake tryout press installed in the Three Star Mfg. Co. plant has a number of interesting features. Corner post construction allows the diemaker to work on the die from all four sides of the press. The long stroke is a safety feature.

By removing a plug in the center of the bolster plate, small dies can be tried out without the need for locating the pressure pins to suit the holes in the bolster plate. If desired, this plug can be removed to allow space for springs and other devices that may extend beneath the bottom of the die.

Dies can be set easily and safely. The slide is under full control of the diemaker at all times. It does not have to be adjusted. The die is ready for tryout as soon as the lower and upper members are fastened to the bolster plate and the slide.

Pumps, accumulators and safety valves are engineered so that the slide can be lowered and the die closed without any danger of overload.

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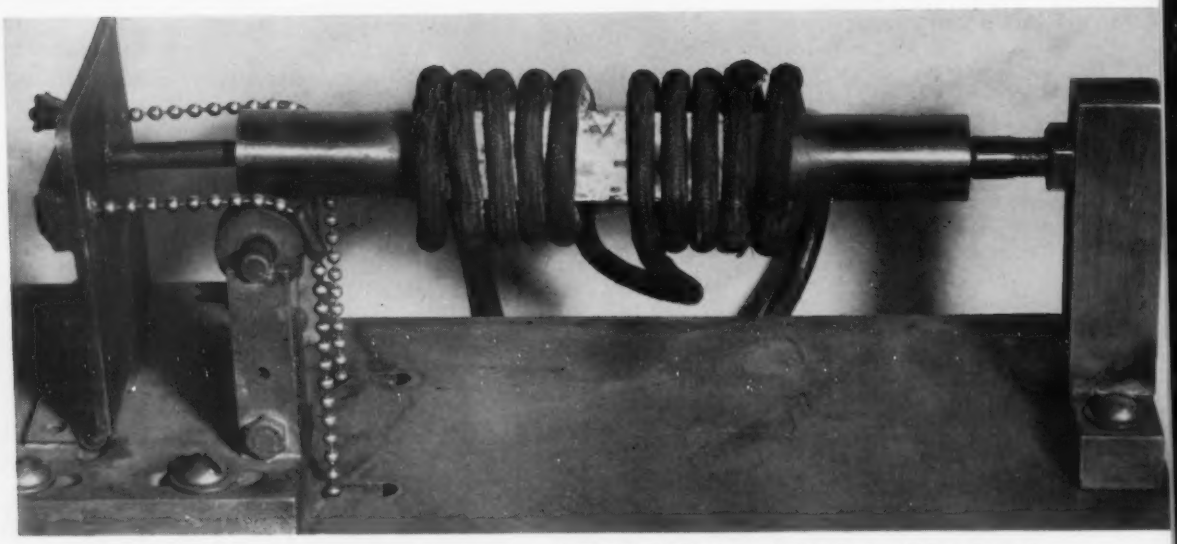


LITHIUM BRAZING ALLOY joins drill rod in air without flux in induction heating test setup.

Eliminate corrosion—

Braze Strong Joints With Self-Fluxing Alloys

◆ Braze without flux with new lithium-bearing alloys . . . Join metals like stainless, nickel and cobalt-base alloys without use of reducing atmosphere . . . Braze in air, at least the common low-carbon steels.

◆ Here's a multipurpose brazing alloy that joins a long list of materials from metals to ceramics, including titanium . . . Joint strength is high, without voids or tendency to corrode . . . It'll help reduce brazing rod inventory, cut two operations from brazing cycles.

By D. A. CANONICO, Associate Metallurgist,
NICHOLAS BREDZS, Research Metallurgist,
HAROLD SCHWARTZBART, Welding Research Supervisor,
Armour Research Foundation,
Chicago

◆ SELF-FLUXING lithium-bearing brazing alloys rapidly approach the metalworking production line. They promise sound joints reproducible in a variety of easy- and hard-to-braze metals, plus the attractive option of brazing in air under some circumstances.

Metals already successfully joined range from ferrous materials with easily reduced surface oxides to stainless steels, nickel- and cobalt-base alloys with oxide surfaces quite resistant to reduction. The new brazing alloys' molten ability to wet surfaces extends also to joining porcelain, clay, silica, cermets and other ceramic surfaces, both to metals and to themselves. Titanium, too, can be brazed without flux, either the pure metal or its alloys.

There's a good chance lithium additions will make possible spraying, coating and hard surfacing with many alloys that previously wouldn't adhere to the base material. Extraordinary tendency of the lithium to reduce surface tension of molten metals, and its high deoxidizing ability, accounts for this enhance-

ment of wettability. The same wetting ability obviously applies with a vengeance to similar mixing problems in the powdered metals field.

For fluxless brazing, two conditions are essential: (1) oxides on faying surfaces must be removed, and (2) oxidation must not recur, either during heatup or actual brazing operations. When these conditions are met, brazed joints have high strength, minimum porosity, plus all the other favorable properties of a good brazement.

An extensive brazing program carried out by Armour Research Foundation for Lithium Corp. of America, Minneapolis, indicates self-fluxing brazing alloys are practical now for use both in inert atmospheres and air. A wide variety of metals have been joined, including those normally considered difficult to braze.

Silver and copper alloys containing 1 pct lithium have been used to braze without flux. Current experimental work will formulate optimum filler metal compositions for specific applications.

Eliminate fluxing

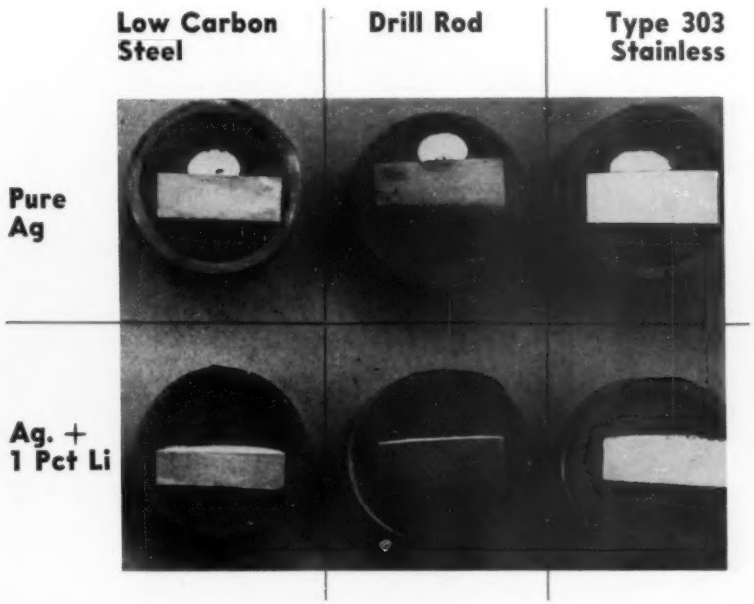
Braze flux residues present the possibility of subsequent corrosion in the joint. Use of self-fluxing alloys eliminates the need for fluxing, thus banishing corrosion from this source.

Flux entrapment and gas voids arising from volatile products of the flux action also disappear with use of lithium-type brazing alloys.

Almost as significant, fluxless brazing eliminates two steps from the joining cycle. Both application and removal of the flux no longer exist. This enables substantial reduction in time for brazing parts, whether manual or automatic equipment is employed. Importance of the "human factor" similarly lessens.

Another interesting possibility of lithium's use lies in its addition to copper. The alloy enhances wettability of SAE 4340 Ni-Cr-Mo steel. Very thin butt joints have been brazed in this steel in an atmosphere 90 pct nitrogen and 10 pct hydrogen, using copper filler metal containing 1 pct lithium. These brazements were later heat treated to strengths in excess of 150,000 psi.

TYPICAL JOINT STRENGTH in drill rod runs 70,000 psi. Note parent metal fracture, indicating strength. Voids visible are not typical.



WETTABILITY of lithium-bearing brazing alloy shows clearly, compared to pure silver. Other stainless specimens brazed in nitrogen with 1 pct Li alloy display up to 52,100 psi tensile.

Standard Tooling Forms Titanium Wheels

◆ Army Ordnance Corps wanted a dozen titanium truck wheels to test out on military vehicles . . . It got them—right off a standard production line that makes steel wheels.

◆ Experience with the titanium prototypes was generally successful . . . Regular line equipment was adequate in most cases . . . Heat distortion was a minor problem.

By W. L. CAMERON, Engineer and C. H. SAVERY, Formerly Engineer*,
Kelsey-Hayes Wheel Co., Detroit
* Now Engineer, Deere & Co., Moline, Ill.

◆ TWELVE titanium truck wheels (size 20x7.5) have been successfully fabricated with the same production tooling normally used for making steel wheels for military vehicles. Material used was commercially pure titanium in the RS-55 grade.

Job was done for the Army Ordnance Corps by the French & Hecht Div., Kelsey-Hayes Wheel Co. Republic Steel Corp., and the Metal Products Div., Goodyear Tire & Rubber Co., also cooperated on the project.

Each wheel is made up of a rim base, a side ring and a disk. Shape of these components and the manner in which they are finally assembled is shown in the accompanying cross-sectional view, taken through the valve slot.

Rim base sections were first rolled and edged on a continuous bar mill. Prior to rolling each rim base, a titanium slab was soaked at 1520°F for one hour. Slab temperature on entering the mill was about 1490°F; finishing temperature was about 1100°F.

Following the rolling operation, rim bases were formed and welded on the regular production line set up for C-1010 steel. Only exception was auxiliary equipment attached to the flash butt welder for continuing the argon wash. This was done until the titanium ring cooled to the point

FULLY assembled titanium indicates the fabricating and machining job required. Center hole and hand holes in disk were pierced; lug holes were drilled, reamed and chamfered.

where it could no longer absorb nitrogen and oxygen in quantities to cause embrittlement. A good weld was obtained and the flash and upset were removed by chipping and grinding.

Side rings were also processed on equipment normally used to fabricate these components from C-1023 steel. Preheat temperature prior to initial circle forming was 450°F. Eight operations later, at the final coining process, temperature had dropped to not less than 350°F.

A tendency for surface slivers to form was inherent in the raw material and was evident in all rings. An adjoining photograph shows a sliver which has only partially broken out of the ring. This happened several times in the 12 rings made.

Machine disks on lathe

Disk blanks were made from 7/16-in. plate stock, circled and tapered on a lathe. Spindle speed was 83 rpm, and cutting was done with a carbide tipped tool under a steady flow of cutting oil.

The roughing cut removed approximately 0.100 in. of stock at the extreme outer edge, and tapered to nearly zero as it moved in toward the disk center. This was followed by a finishing cut for final blending of the contour. In production this taper would undoubtedly be press-formed rather than machined.

Disks were then trimmed and formed following less than four minutes of gas furnace heating to bring the blank temperature to 850°F at the center and 1050°F at the outer edge. The trimming and forming die was heated to 1250°F and lightly coated with a molybdenum disulphide compound. The workpiece formed well without scaling.

The large center hole was then pierced in the same press after the disk had been reheated to bring the mid area to 900°F-950°F.

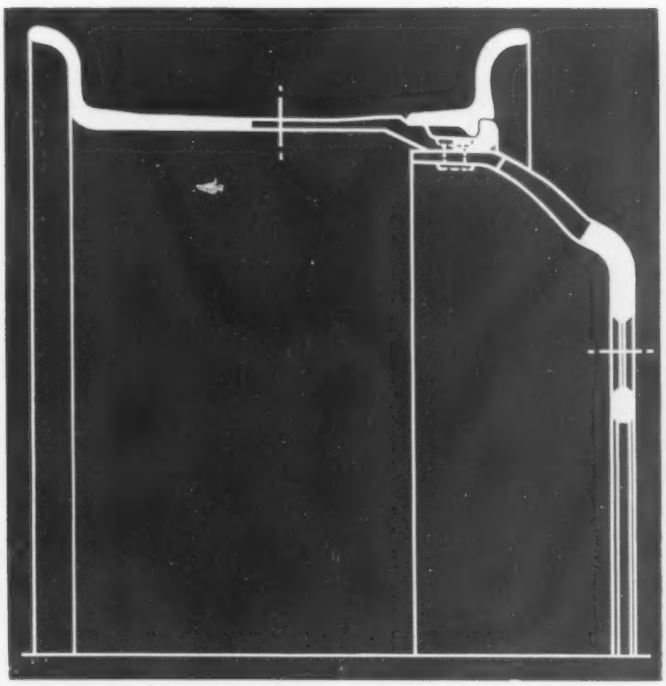
Piercing and flange sizing on the disks was generally successful except for some heat distortion. Additional tooling would be indicated to nullify this distortion effect, and shrinkage of the cooling metal would have to be considered together with the tendency of the mounting plate to warp. Successful development of this operation would eliminate extra flattening and sizing.

Drilling, reaming and chamfering of disk holes was done with conventional tools at the same speeds employed for steel disks, using soluble oil as a coolant. Dull tools appeared to work better than newly sharpened tools, which had a tendency to chatter. A four-flute end mill was used dry to notch the disks for valve stem clearance.

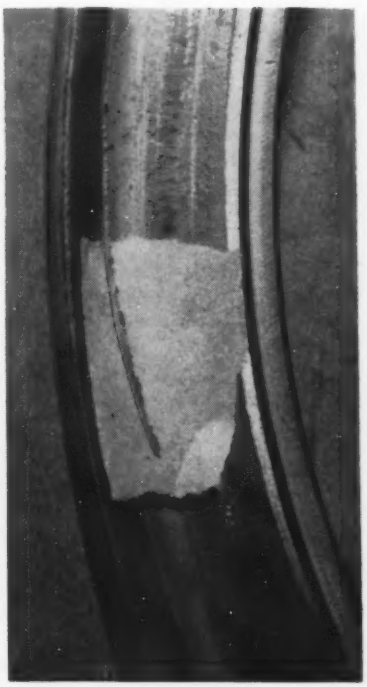
Final assembly of wheel components by press fitting and riveting was accomplished with ease. However, rivets were heated to avoid overexpansion in the hole and to form a satisfactory head.

The twelve prototype titanium wheels were delivered to the Ordnance Corps for laboratory and field testing. Test results are not yet available.

CROSS-SECTION of shape and assembly method of rim base, side ring and disk for truck wheel.



SURFACE slivers like this were found in all side rings. Tendency was inherent in raw material.



To reduce friction—

How to Choose the Best Drawing Lubricant

◆ At first glance, the number of drawing compounds used in modern press working seems limitless and confusing . . . How to go about finding the best one for a particular metal and a particular job?

◆ This article attacks the problem by grouping lubricants into three basic classes . . . From there it follows current best practice for ferrous and nonferrous metals . . . A handy reference chart wraps it all up.

By E. L. H. BASTIAN, Senior Engineer, Shell Oil Co., New York

◆ THREE CLASSES of lubricants are generally used in forming metal by press working and drawing. One group includes the so-called polar compounds. These long-chain chemical structures tend to orient themselves on metal surfaces in a prescribed way that prevents direct contact between the die and the work at moderate loads. Lard oil, oleic acid, rape seed oil and castor oil are typical polar compounds.

A second group of lubricants, described as "polishing" agents, produce a more active chemical effect than the polar compounds. Certain of the phosphates are found in this group: tricresyl phosphate, for example. Usually, a combination of the polar compounds and the "polishing" agents is preferable to the use of either alone.

The third general class consists of the so-called E.P. (extreme pressure) lubricants. Typical compounds contain sulphur and chlorine which react with the metal surface, forming films which will shear in preference to the metal tearing itself. Moreover, the films continually replenish themselves, thus preventing build-up or galling of work metal on dies.

These three lubricant groups, and combinations of them, provide a wide range of fluids and compounds for press working. The list is extended further by the water-based or aqueous dispersions that are also found in each class. Then, too, oils, either as mineral oils or combinations of mineral or fatty oils, may be compounded to include the foregoing lubricants and/or solid materials..

For drawing carbon and low-alloy steels, a pigmented, paste-type lubricant is generally used. But for blanking, stamping and shallow drawing, a non-pigmented, water-base fluid or an oil may be employed.

Apply paste-types easily

"Pigment" refers to the solid fillers that are sometimes used in paste-type compounds to give the benefits of solid lubrication. Such compounds may be diluted with from one to five parts of water and applied by a swab, dip, wiper, roller or spray.

The phosphate and oxalate coatings commonly used in the forming and drawing of carbon steel and stainless steel have a couple of advantages over simple lime or borax coatings: (1) they contain many tiny air spaces to retain

Drawing Oil And Compound Recommendations

Drawing Operation	Carbon Steel	Alloy Steel	Stainless Steel	Aluminum	Copper and Brass	Bronze Alloys	Nickel Alloys
Blanking and Stamping	A, E 6	B, E 6	D	E 6	A, E 6	F 6	B, C
Shallow Press Drawing	E 4	F 4	D	E 4	B, E 4	F 4	B, C
Deep Draw (Cold)	F 2	F 1	D	C, E 3	C, E 3	F 3	B, C
Deep Draw (Hot)				G*			
Heavy Cupping	F 2	F 2	D	C, E 2	F 2	F 2	C, D

LEGEND

A. Drawing Oil—Straight mineral S. S. U. 100 to 300 @ 100° F.
B. Drawing Oil—Mineral—fatty oil blend.
C. Drawing Oil—Straight fatty oil.
D. Drawing Oil—Sulfurized or chlorinated oil.
E. Emulsion—Soap-fat compound (Note 1).
F. Emulsion—Pigmented soap-fat compound (Note 1).
G. Solid—Graphite in light vehicle (petroleum).

* Also applicable for hot draw of magnesium.

Note 1:
Suffix number following recommendation indicates water dilution to be used.
Thus: E 4 is a mixture of 1 part compound to 4 parts of water.

the lubricants that are subsequently applied; (2) they bond chemically to the die and workpiece surfaces with a tenacious film that prevents metal-to-metal contact under very high unit pressures.

On stainless steels and other highly alloyed materials, the chemically-active oils and compounds, such as chlorinated oils and waxes, are found increasingly effective. Some of the Nimonic alloys (also titanium) lend themselves to better forming with these chlorinated materials.

Drawing of copper and brass is done with either water-based emulsions or mineral-fatty oil blends. The paste-type emulsions commonly used are similar to those employed in drawing steel, except that some care must be taken in controlling free fatty acid. Such acids are effective polar compounds, but if used to excess on copper and copper alloys, they result in undesirable staining. Still, this excess is often allowed for heavy primary draws with full knowledge that a pickling operation will be required to remove the stain.

Heavy cupping draws use a pigmented compound which contains about 10 to 15 pct of some inorganic material such as clay, talc or mica. Ingredients of this type serve to cushion and separate the die and work surfaces.

LUBRICANT applied with swab before sheet is formed into automobile rear-quarter panels.

A Good Drawing Compound Should—

Reduce friction
Prevent wear
Stop metal seizure
Cool the work
Not stain the work
Not corrode metal
Be convenient to handle
Be easy to apply
Be non-toxic
Be economical

Dry soap coatings are effective drawing lubricants for both ferrous and non-ferrous metals. A hot, aqueous soap solution is usually applied first. It is then air or oven dried to leave a thin, hard and clean coating. Generally, the dry soap surface is preferable to a wet one, except in special wire drawing and wet-wire drawing machines.

Keep dry soap coatings soft

Use of a high melting point soap is preferable, also, because it adheres longer under conditions of high spot-friction temperatures which occur in forming metal. For this reason, sodium soaps are usually chosen instead of potassium soaps for severe forming operations.

Many dry soap coatings contain other substances, too. There are combinations, for example, of sodium soaps with fatty acids, plus borax or other moisture-absorbing materials that prevent the compound from becoming too hard for use.

Magnesium is usually formed and drawn hot, somewhere in the range of 450°F to 700°F. Obviously, lubricants which might char or otherwise become unuseable at these temperatures must be ruled out. Solution is to use relatively inert substances like mica or graphite—molybdenum disulphide has been tried recently—carried in a light solvent such as naphtha. In practice, the solvent flashes off and leaves the solid lubricant as a flat, laminar coating on the metal surface.

But there are differences in kinds of solid lubricants. Mica or graphite leaves a flat, fish-scale type of coating on the work surface, whereas more fragile materials, such as some of the clays, form particles that are more readily subject to fracture.

Under certain press drawing conditions, the fracturable type solid constituents are preferable. They do provide separation of metal surfaces, but under controlled conditions. This means that as unit pressure gets higher, these particles fracture and act as a cushion allowing a controlled amount of contact.

If materials are used which provide too definite a protection from contact between metal surfaces, the blank in the press may go out of control. Thus for control purposes, it may be much better to allow some metal-to-metal contact, despite the wear that will result.

Aluminum needs more fatty acid

Both oil-type and water-base lubricants are used in press drawing aluminum. Generally, water-base materials are used, such as paste-type emulsions. And they may be further diluted with water or other aqueous solutions. These contain not only soaps which act to form a homogeneous emulsion, but also fatty polar compounds.

Because aluminum is rather difficult to wet, the fatty acid content of a workable press drawing compound is usually higher than is needed in a compound for drawing ferrous metals. For aluminum, fatty acid content should be on the order of 6 or 8 pct; possibly as high as 10 or 15 pct. For steel, the same constituent will generally be effective at three or four percent.

Where oils are used as aluminum-drawing lubricants, they are usually compounded with polar type materials such as the fatty oils.

The type of press drawing operation may dictate the type of lubricant to be used. For example, in stretch forming aluminum, emulsion types of lubricants may be called for. Or certain solid lubricants may be used, such as lime-based greases, ordinary yellow cup base greases, or yellow naphtha soaps. Compounded heavy mineral oils, like cylinder oils, can also be used.

But when the work is heated, say above 400°F to make forming easier, then relatively inert lubricants must be used to prevent the formation of gummy deposits on the surface.

Where non-metallic dies, such as plastic dies, are used, it is possible that no lubricant will be required. This can occur when the coefficient of friction between the die and the work surface is extremely low.

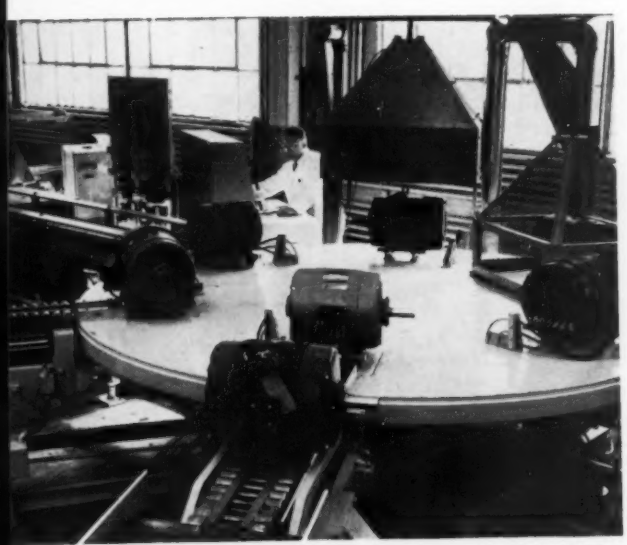
In rubber-pad forming work, such as Marforming, some of the light, neutral, potassium soap solutions are applied effectively. In this same class of work, blends of light mineral oil and neutral or fairly neutral fatty oils, such as a low free-fatty-acid lard oil, can also be effective.

Systematized Approach Pays Handling Profits

Integrated handling is the theme of today's materials handling strategist . . . Systematization in plant handling problems must take the place of the old sniper approach . . . Automation demands it.

Some of the country's top handling experts stressed the integration theme last week at the Material Handling Institute's 1956 Exposition . . . Talks covered various topics . . . Here's a capsule version of the meetings.

By J. G. LONG, Associate Editor



General Electric Co.

'AUTOMATION COSTS MORE' was one of four cliches debunked. It need not be unique or nonstandard to perform its duties automatically.

◆ AUTOMATION came in for its share of attention in Cleveland last week—but so did recognition of the fact that many plants are nowhere near ready for automation. And the top drawer experts assembled to address American Material Handling Society's Technical Sessions managed to cover a good bit of ground between these two conditions of industrial being.

"Automation and advances in mechanization are a part of the American scene," Harvard's James R. Bright remarked to one portion of the overflow crowd (estimated at better than 20,000) on hand for Material Handling Institute's 1956 Exposition. One of 12 speakers tackling various aspects of the show theme "Integrated Handling — Management Profit Tool," he debunked four common cliches about automation.

Work Simplification Conference's Alan H. Mogenson took another approach.

"Automation and electronic devices aren't going to help the small shops," he said. "Usually one must produce tremendous quantities and be frozen as to type of product before going into real automation. The small shop cannot justify the investment involved." Yet management can cut costs 10 to 40 pct, he suggested, simply by letting labor into the work simplification act with an effective program.

There was material to interest all levels of management at the June 5, 6, 7 meetings.

Other speakers covered handling-related topics as varied as traffic management and distribution, warehouse layout, plant layout distribution, warehouse layout, plant layout, cost analysis and managerial problems arising out of automation. Speakers included such notables as Method Engineering Council's Grover Barkdoll, Academy of Advanced Traffic's E. Albert Ovens, Michigan State University's James

Whiting Corp.

HIGH handling equipment costs justified? They are in this case where a monorail serves three machines without interfering with production.

Apple, and George R. Raymond, Jr., President, The Material Handling Institute, Inc.

Also heard were Andrew J. Briggs, Head of Material Handling and Warehousing, Navy Bureau of Supply and Accounts; Fred V. Gartner, Fred V. Gartner Associates; Wilbur D. Warner, Sears, Roebuck & Co.; Joseph W. Shimp, Marinette Paper Co.; H. B. Maynard, Methods Engineering Council, and Dr. Lillian Gilbreth, Knapp Visiting Professor.

Mr. Bright surveyed 13 plants as a basis for his arguments against the popularly-held misconceptions on automation.

One of these currently popular notions, he said, is that the purpose of automation is to eliminate labor. There is a reduction in labor content per unit product. But it's important to distinguish between eliminating labor and raising productivity per man hour, he pointed out. In 9 of the 13 plants recently surveyed, they did the latter, not the former.

Management has been far too shortsighted, Mr. Bright said, in assuming that reduction of labor content is the principal or only benefit. This overlooks such other valid reasons for automation as quality, reduction in lead time, product redesign, improved safety and working conditions and reduction of in-process inventory.

The second cliche, he said, is that automation must cost more. This isn't necessarily so, he pointed out, because one of the effects of automation is to pull the plant into a smaller building and into less space.

Even though automation costs more per pound of machinery where this pulling in can be done to a great enough degree, the number of pounds is reduced so much that there's a good chance of getting the automatic plant for the same money as the conventional plant —or even less.

"Also," Mr. Bright pointed out, "automation is not necessarily a product of special machinery. Thus, if the automatic plant can be built of standard components, costs are not raised nearly as much as when unique machine design is required for each part."

Management's frequent habit of dawdling along, then suddenly deciding they want automation, and in a great rush, does cost money. But this, he said, is the high cost of haste.

The third cliche is that automation means great maintenance problems and high maintenance costs. Maintenance is proportionate to novelty and uniqueness, not to how automatic something is, said Mr. Bright. And you can look forward to considerable de-bugging if you're introducing unique machinery, he added.

Automation's impact on labor is the fourth area of confusion. Except for hydraulic repairmen, pneumatic repairmen and electricians, Mr. Bright said, he feels that automation's effect on skills is to make people more employable by downgrading the requirements for a

job, instead of upgrading them.

"There is a very definite impact on supervisors," he said, "—the need for fast reaction. When the plant makes things fast, it can make bad things fast, and the supervisor must act quickly."

The sales department feels the impact of automation most of all. When a company is committed to automation, the sales department has to sell what the machines produce, instead of the traditional approach of the factory producing what the sales department can sell. The sales department is then paced by the machine just as surely as any worker is.

The work simplification ideas advanced by Mr. Mogenson dealt with more closely integrating the activities of workers, rather than integration of machinery as in automation.

"It is the people you have working for you now who will make the (10 to 40 pct) savings," he said. The old employe suggestion system with its 75 pct or better rejection rate hasn't worked, he pointed out—the goal of a work simplification program enlisting every single person in the company is to get 85 to 98 pct of employe suggestions installed.

The philosophy, he explained, is that difficult problems can be reduced to simple steps, and that management can control efficiency of operation by stimulating employes to be constantly alert for possible improvements.

Intelligent suggestions require three things, he said—the desire to solve problems, the means, and management's capacity to handle the human relations problem involved.

Desire involves letting your people understand such business problems as the need for cost reduction and method improvement. Then your workers will want recognition for their ideas—to see them put in and working. Training in such simple problem-solving techniques as flow process charts will help provide workers with the means for tackling improvements.

The industrial relations problem involves two obstacles. These are resistance to change and resentment of criticism.

"However, let a change be the worker's idea and the program will have his full support," said Mr. Mogenson. When a man works out an idea for himself or with his supervisor's help, and finds an idea costing $4000 will save only $50 a year, he'll reject it himself and won't be mad at anyone. If the same idea were dropped in the suggestion box and nothing was done about it he'd get mad.

"It's this change in attitude and morale of the worker that will change 75 to 80 pct rejections to 80 or 90 pct acceptance," the speaker concluded.

Navy's Andrew J. Briggs offered some sound suggestions on warehouse stock positioning and space control, based on his department's research into warehousing considerations.

Popularity positioning, by speed of issue, ranks first among the four most important considerations for good warehouse layout, said Mr. Briggs. Approximately 90 pct of the work is accomplished on about 15 pct of the items. Thus by placing stock in the order of fast, medium and slow movers, small lot operations can be concentrated for easier, faster handling.

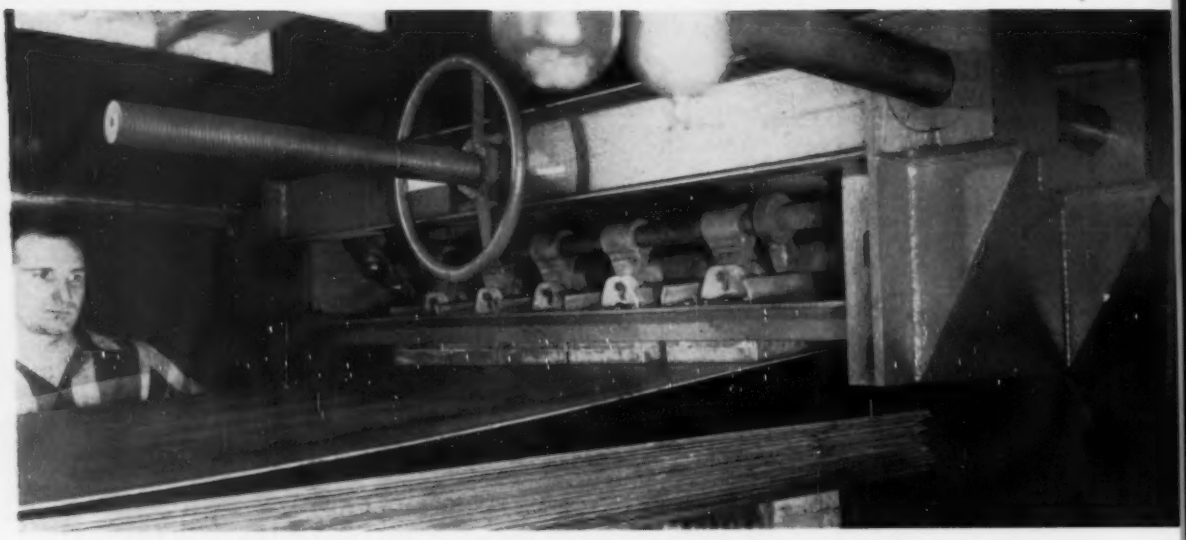
Other considerations listed in order of importance by Mr. Briggs were similarity of items in terms of whether they are shipped, received or inventoried together; size, for better division between retail and bulk areas; and peculiarity of characteristics.

As an example of this, he cited the need to separate oxygen and acetylene gas to minimize dangers of explosion on mixture.

The importance of integrated pre-planning in designing new plant layouts around a well-planned materials handling flow pattern was discussed by Michigan State University's James Apple. "Material Handling cannot be properly integrated into plant layout unless it is designed in, from the start," he said.

BUILDING A PLANT? Michigan State University's James Apple offers this capsule guide to planning manufacturing facilities for efficient handling:

1. **Procure basic data.**
2. **Analyze and coordinate basic data.**
3. **Plan general material flow program.**
4. **Select general material handling plan.**
5. **Select specific material handling equipment.**
6. **Consider building types.**
7. **Sketch plot plan.**
8. **Calculate equipment requirements.**
9. **Plan individual work stations.**
10. **Coordinate individual operations.**
11. **Calculate storage space rquirements.**
12. **Construct flow diagrams of production centers.**
13. **Plan service areas.**
14. **Allocate production and service areas on plot plan.**
15. **Construct master Layout.**



PERMANENT MAGNETS each lift with force of 75 to 100 lb, move sheet to shotblast operation.

Give Sheet Handling A Lift With Magnets

◆ Sheet steel handles awkwardly . . . And low cost equipment to mechanize the job is hard to come by . . . Manhandling too often is the answer . . . But there is another: permanent magnets.

◆ Magnets can simplify and speed feeding sheet to machines, while lessening chances of worker accident . . . They fit easily into most present line production setups, lend themselves well to automation.

◆ PERMANENT MAGNETS can supply simple solutions to tough materials handling problems. Consider the troubles in separating, shifting and positioning sheet steel. Its awkward dimensions militate against use of much standard handling equipment.

Previously, heavy manhandling proved satisfactory. It's still the only answer to a few metalworkers, and just tolerated by a number of others. But as long as manual loading and unloading bottlenecks the production line, expect no great benefits from mechanization.

Magnetic loaders and unloaders can break that bottleneck. At Kelsey-Hayes Wheel Co., McKeesport, Pa., they did just that. Sheet steel in large quantities is fabricated there to make up more than a million car, truck and tank wheels annually.

With permanent magnet loaders, rate of sheet feed on several jobs is considerably higher. The equipment practically eliminates heavy sheet lifting. Operators now control feed rates and accuracy more closely, since their attention is not distracted by the job of raising sheet after sheet to machine level.

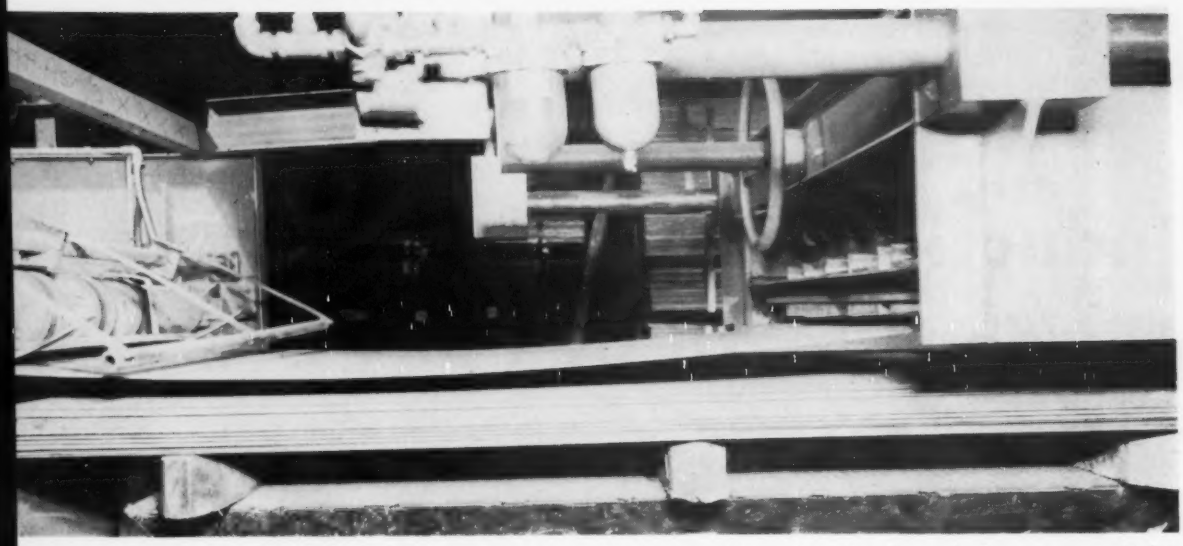
Magnetic handling lends itself to high speed line production. Automation can now enter the shop picture, where before the need for manual handling made advantages of such an improvement remote.

Clumsy to heft

Two operators formerly fed sheet stock by hand into cleaning and shearing equipment. After prying each sheet from the top of the pile, operators laboriously manhandled the sheet toward the shears or cleaning rack. Worker accidents were not unknown.

Suction cups could have helped. But even with these, the manual work remained. In addition, cups could introduce a maintenance problem.

Sheet stock generally runs about $\frac{1}{8}$ in. thick. Average sheets measure 4 x 7 ft, and weigh 140



PINCH ROLLERS (left) pull sheet into shotblast machine. Sheet breaks easily from magnets (right).

lb. Hefty pieces like this can't be fanned out prior to pushing into the machines, as with tinplate.

New handling equipment employs either plate or roller magnets. In a shotblasting operation, five 7-in. plate magnets mount along a carriage designed for both lateral and vertical travel. Each magnet pulls at 75 to 100 lb, according to the supplier, Eriez Mfg. Co., Erie, Pa.

Mounting shaft passes through oversize elongated holes in magnets. This floating pivot reduces impact when magnets lower to the sheet.

In operation, air cylinders actuate the bank of magnets. After dropping to the sheet surface, magnets lift and move it forward into a set of pinch rollers. Rollers draw the sheet forward, breaking it loose from the magnets. Plate magnets pivot somewhat in the process, drawing away from the sheet surface at their leading edges. This facilitates breaking the sheet away from the magnetic pull.

For a shearing operation, overhead roller magnets lift sheet from the feed table. Each of four rollers holds with a magnetic force of 50 to 65 lb. All are chrome-plated for wear, and measure $4\frac{3}{8}$ in. OD by $3\frac{1}{2}$ in. long.

MAGNETIC ROLLERS separate sheet from stack making it easy for operators to roll it into shears.

At high speed—

Induction Setup Hardens Teeth By Pairs

◆ INDUCTION HEATING won another nod of approval in high-speed case hardening of rack teeth, two at a time. One pair after another index accurately into position, are heated and quenched automatically to a predetermined case depth. High volume output of the induction heating setup helps to maintain smooth production flow on the typewriter assembly line at the Poughkeepsie, N. Y., plant of International Business Machines Corp.

Strong magnets act as jigs to firmly hold typewriter escapement racks throughout the hardening process. Magnets also help prevent warpage resulting from the progressive heating and quenching cycles. Typewriter racks can have up to 100 teeth, involving half as many hardening cycles.

A master escapement rack controls indexing within close tolerances. High-frequency induction equipment hardens teeth of three racks, each of differing tooth pitch. The operator readily substitutes one master rack for another at changeover time. The only additional setup job, readjusting the indexing mechanism, needs just a few minutes.

Hardening proceeds automatically

In production, three strong magnets clamp the rack workpiece slid into position by the operator. His only other task prior to unloading is starting the induction heating cycle. While case hardening of the teeth progresses, the operator performs other duties.

A pneumatically-operated arm lifts the spring-loaded detent from the teeth of the master rack in the first part of the indexing cycle. An air cylinder then pushes the entire carriage along twin way rods a distance of two teeth. The detent slips back into firm contact with the pair of teeth following, assuring accurate indexing. Uniform pull of a deadweight attached to one end of the slide eliminates backlash.

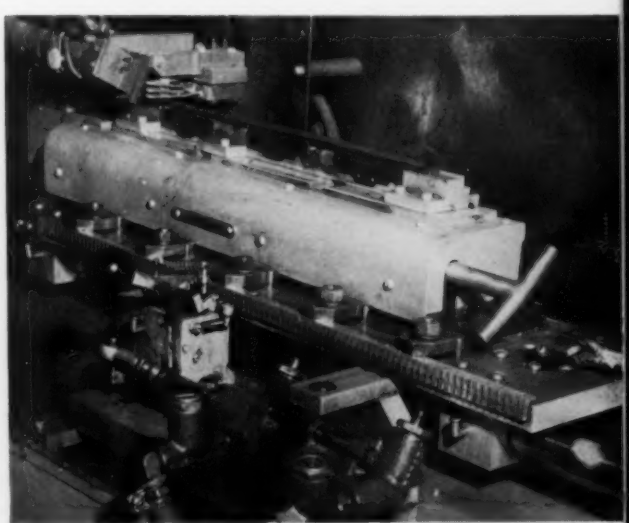
Hairpin induction coils sit just above rack teeth. They heat just two teeth at once, and only to a specified depth. An electronic timer cuts the circuit precisely to avoid chances of overly deep heating.

Water quenching follows immediately after heating.

The timer then actuates a solenoid that trips an air valve to start the next cycle. When each pair of teeth is case hardened, the Thermonic induction heater stops automatically. The operator turns from his other work, unloads the hardened escapement rack, and replaces it with another.

Heating takes place too rapidly to affect more than a small volume of the rack metal at any one time. Rack base remains comparably cool, so it warps little. Straightening, if needed, is handled without annealing.

Only the teeth case harden. Remainder of the rack stays tough and ductile.



RACK MASTER (at bottom) indexes accurately, controls case-hardening cycle of rack teeth, two by two. Controlled hardening minimizes warpage.

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- ★ Exceptional Slide guiding and barrel type adjustment
- ★ Air Counterbalances on slide
- ★ Totally enclosed gears running in oil
- ★ J. I. C. Dimensions

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for drawing, forming, trimming or blanking.

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Photo courtesy of Long Manufacturing Division, Borg-Warner Corporation, Detroit, Michigan. Minster S1-500 Press used in production of clutch coverplates for the automotive industry.

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CHAIRMAN, THE CINCINNATI GEAR CO.

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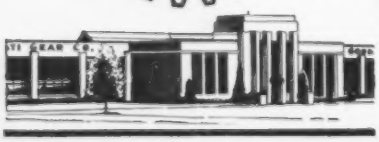

FREE AIDS

New Technical Literature:

Catalogs and Bulletins

High-speed metal saws

Friction, abrasive, cut-off and long cut saws are featured in eight page booklet. Folder contains information on newest models and latest adaptions of company's line of saws for cutting steel, iron, copper, aluminum, magnesium, titanium, etc. In two-colors, it shows photographs and illustrations of saws and tables for virtually any use. Basic advantages presented are: versatility, accuracy, low investment, speed and ease of operation. Impressive list of users and specifications of four series are given. *Ty-Sa-Man Machine Co.*

For free copy circle No. 1 on postcard, p. 117

Tempered bar steels

Tempered bar steels eliminate heat treating, straightening and cleaning operations, lower distortion during parts fabrication, provide higher strength and insure uniform machinability according to a four-page color leaflet. Literature explains application, specifications and gives typical uses of strain-tempered steels. Illustrated uses appear. *Bliss & Laughlin, Inc.*

For free copy circle No. 2 on postcard, p. 117

Fifth wheel fork truck

Folder illustrates and describes new 3,000 lb capacity fork truck. Engineered to handle loads in confined areas, it features compact design with short wheelbase and fifth wheel steering to permit maneuvering in narrow aisles and inside truck trailers and box cars. Model has 3,000 lb capacity at 24 in. on a 68 in. high truck and a 3,000 lb capacity at 20 in. on an 83 in. truck. Literature contains installation and product photographs, major component illustrations, plus engineering drawings which supplement detailed specifications. Design features are included. *Elwell-Parker Electric Co.*

For free copy circle No. 3 on postcard, p. 117

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 117.

Temperature controller

Specification sheet describes the electronic temperature controller. This is a non-indicating device, which operates on the balanced bridge principle. It can be supplied as a single point controller, using a single bulb, as a differential controller, for control on the temperature difference between two bulbs, or for cascade control, using two bulbs. *Minneapolis-Honeywell Regulator Co.*

For free copy circle No. 4 on postcard, p. 117

Maintenance painting

New spray painting products, designed for the maintenance and contract painter are included in a maintenance painting catalog. Included is a new spray gun which is used effectively with a ½ or ⅓ hp air compressor, a paint pump and a portable paint heater. Booklet contains chart which specifies correct spray gun to be used with various materials. Variety of models are made. *DeVilbiss Co.*

For free copy circle No. 5 on postcard, p. 117

Sludge cleaning

How to clean sludge out of hydraulic and lubrication systems without shutting down machines is told in company's new bulletin. Continued use of these highly detergent oils keeps equipment as clean as new, the booklet says. *Sun Oil Company.*

For free copy circle No. 6 on postcard, p. 117

Portable cutting tools

Literature tells of new portable cutting tools. These are described as eliminating distortion, binding and ragged edges common to other forms of portable cutting tools. Job ranging from machine guards and template making to trailer bodies and stainless steel kitchens are just a few of its many applications. Features of the tool are said to be: (1) Portability, (2) maneuverability, (3) ability to cut cleanly without distortion of metals or excessive burring, and (4) follows a pattern or template and cuts from any angle. *Fenway Machine Co., Inc.*

For free copy circle No. 7 on postcard, p. 117

Versatile epoxy pastes

Company has just completed a long time evaluation of several important epoxy pastes. These are described in a new release. The pastes, containing no volatile matter, possess adhesion and have negligible shrinkage. High in strength and capable of curing at room temperature, they are used as patching compounds, filleting compounds, sealers, and for making tools and fixtures. They are described as appliable to ceramic industries as ideal waterproof tile setting compounds; in electrical industries for coating purposes; in aircraft industries to seal porosity in large plastic radomes; in joining large clay sewer pipes and in sealing porous metal castings. One in particular has attracted wide attention as a "plastic steel" containing up to 80% powdered iron. *Furane Plastids, Inc.*

For free copy circle No. 8 on postcard, p. 117

Punch press feeding

Company catalog is available to users of feeding equipment for punch presses and reels and straightening machines for coil stock. In 28-pages it tells of company's line of coil stock handling and punch press feeding equipment. It pictures and gives details on contents of 24 different new bulletins on equipment available. *F. J. Littell Machine Co.*

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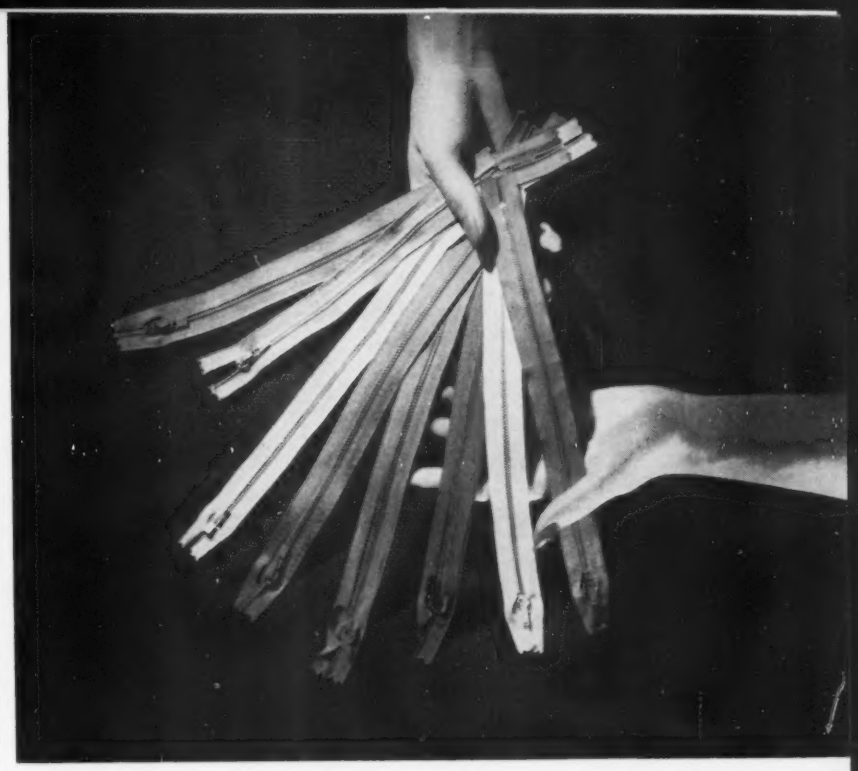
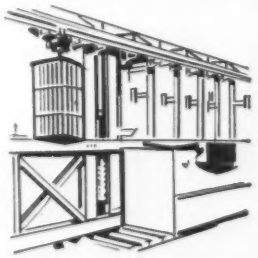


Fashion-hued fasteners flash through UDYLITE machine at a mile-an-hour clip!

When High Fashion called for color in metal slide fasteners, the manufacturer consulted Udylite. And Udylite came up with the answer—a unique application of Udylite's Fully Automatic Plating Machine to anodize aluminum fastener parts, dye them and seal the color in—*all in one operation!* Now, smartly colored slide fasteners are flowing forth at the rate of 6000 feet per hour.

Udylite Fully Automatic machines are now being used to anodize a wide range of products—refrigerator trays, name plates, aircraft parts, automotive grilles, wheel covers, transmission cases—practically everything of aluminum that is anodized on a mass-production basis. And Udylite machines will cut costs on every other treatment of aluminum—dye-anodizing, bright dipping, anodic etching, electropolishing and electroplating of course!



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FREE TECHNICAL LITERATURE

Special road grader

Equipped with a 50 hp, six cylinder engine, a new road grader is described in company's booklet as a "special" that gives "big grader performance and versatility" along with small grader economy. With a stand-up cab, the new grader may also be equipped with company's Tornado Turbulence diesel engine. It has a shiftable moldboard, improved scarifier, leaning front wheels—all hydraulically controlled. Folder gives brief but fairly complete rundown on use, accessories and vehicle nomenclature. *Allis-Chalmers Mfg. Co.*

For free copy circle No. 10 on postcard, p. 117

Chromium and manganese

Illustrated folder describes properties and uses of electrolytic chromium and manganese. It contains analysis and specifications of new high-purity electrolytic products. Information on both ferrous and non-ferrous applications is also given. *Electro Metallurgical Co., Div. of Union Carbide and Carbon Corp.*

For free copy circle No. 11 on postcard, p. 117

Refrigeration tube

Literature on Aluminum preassembled refrigeration parts emphasizes elimination of welding and assembly operations. Assembly consists of a bunch-type aluminum spiral coil, a one-piece aluminum accumulator and two copper-to-aluminum connectors. Printed matter lists plain tube; integral fanned tube; high fin aluminum with copper liner, copper-base alloy or steel; serpentine coil, spun end tube and extruded aluminum shapes. *Wolverine Tube Div., Calumet & Hecla, Inc.*

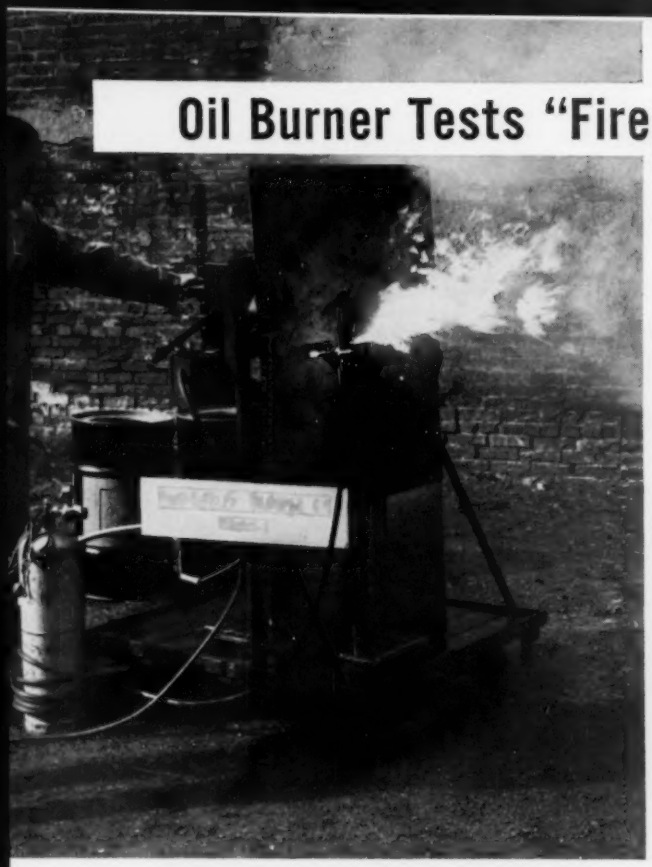
For free copy circle No. 12 on postcard, p. 117

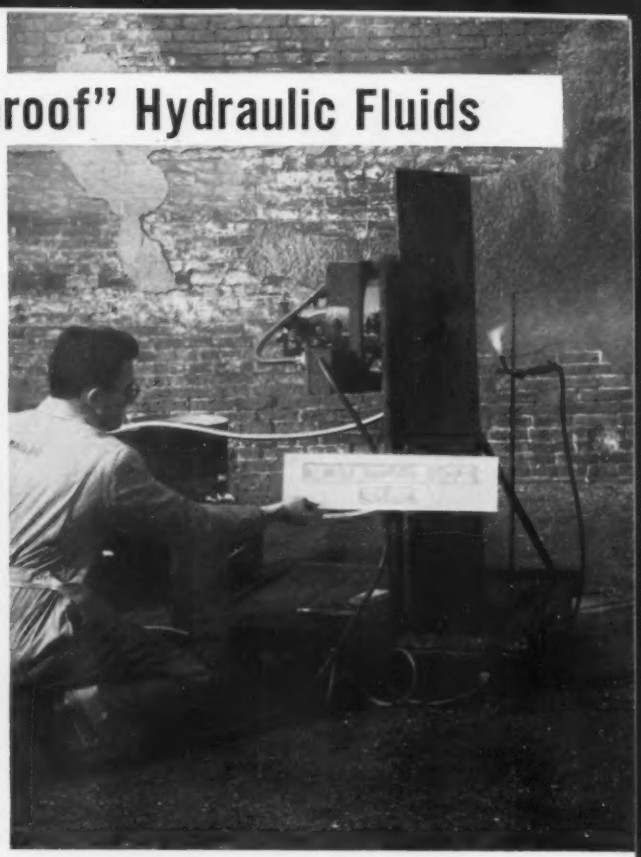
Paint spray machine

Brochure on an automatic reciprocating-type spray painting machine is now available. It includes illustrations and complete description of this air operated, electrically controlled machine designed for spraying of areas up to 12 in. wide and 40 in. long. *Matrix Corp.*

For free copy circle No. 13 on postcard p. 117

Oil Burner Tests "Fireproof" Hydraulic Fluids





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FREE TECHNICAL LITERATURE

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This section starts on p. 112

Automatic lubricators

Automatic, cyclic-type lubricators for metered oil feed by simple mechanical drive from machines lubricated are described in four-page, two-color brochure. These provide automatic lubrication to metalworking machinery, printing presses, packaging machinery, machine tools, etc. Bulletin describes two cyclic lubricators for larger machines: a rotary unit driven from any rotating shaft by belt, chain or gear drive, or by direct motor drive; and an oscillating drive lubricator by eccentric, crank or reciprocating machine part. Included are details of lubricators' pump mechanism, filters, reservoir and distribution system. Reduction ratios, direction of drive, working angle of drive arms and discharge volume are tabulated. *Bijur Lubricating Corp.*

For free copy circle No. 14 on postcard, p. 117

Industrial couplings

Suited for use in every industry from Agriculture to Zymurgy, illustrated brochure describes "all-purpose" industrial couplings. These, it says, provide fast, safe and sure connections for carriers of coolants, lubricants and a wide variety of liquids. It tells of both full-flow and self-sealing couplings that connect with a simple one-quarter twist. Coupling is identified as a unique application of the "inclined plane and ball" principle and employs three major parts: a cam ring, ball cage and nipple. It is said to have proven its ruggedness under lab tests and in actual use. Big advantage: Coupling is either locked or unlocked; there is no in-between. *Roylyn, Inc.*

For free copy circle No. 15 on postcard, p. 117

Nickel-aluminum bronze

With tables, charts and photos, a comprehensive report on the development of nickel-aluminum bronze is available. Application for marine propellers and use of the material in aeronautical, power, electrical, metal working and process industries is explained. Nickel-aluminum bronze provides high tensile properties, resistance to corrosion, cavitation and erosion, and weight savings as high as 20%, it says. *International Nickel Co., Inc.*

For free copy circle No. 16 on postcard, p. 117

Selenium rectifiers

Revised edition of guide to power conversion rectifiers has been published. The 12-page "guide" has photographs showing rectifier sizes and styles for every dc power need, plus detailed information for selection of rectification equipment. It also illustrates a self-contained selenium unit. *Bart-Messing Corp.*

For free copy circle No. 17 on postcard, p. 117

Stainless steels

Engineers and others associated with design or maintenance of processing equipment and piping should be interested in an eight-page technical folder just issued. Bulletin deals with seamless and welded stainless steel pipe use. Stainless steel welding fittings are covered where corrosion or elevated temperatures are determining factors. It contains application data on most widely used stainless steels and furnishes helpful hints on bending, joining and welding. *Tubular Products Div., The Babcock & Wilcox Co.*

For free copy circle No. 18 on postcard, p. 117

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 6/14/56

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Heavy-duty pumps

Literature features new material handling pumps for high volume, continuous operation primarily on maintenance painting, production finishing and coating applications. Units are described as readily adaptable to wide range of general purpose and high speed production needs. Efficiency and convenience of operation is claimed superior to anything previously developed. Maximum speed, economy and safety in material handling is mentioned. *M & E Mfg. Co.*

For free copy circle No. 19 on postcard, p. 117

CO_2 foundry process

In a 16-page booklet, CO_2 Foundry Processes using carbon dioxide gas for hardening cores and molds are discussed. Booklet is based on information gathered by company's technical representatives cooperating with foundries using the process in production. Subjects discussed are advantages of the process, problems encountered and solutions, and methods and materials. Among the latter are binders, types of sand, mixing, ramming, gassing, collapsibility and sand reclamation. *National Gas Cylinder Co.*

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Heating cable

Information on heating cable is given in a new booklet containing product, application, and installation material. Collateral data to help in selection and installation of heating cable for any specific job is included. It gives three types of heating cable: silicone rubber-insulated with lead jacket, asbestos-insulated with lead jacket and silicone rubber-insulated with silicone rubber jacket. Typical applications of heating cable described in the booklet are for pipe heating, snow melting and soil heating for farms and nurseries. Included are diagrams of proper installing methods. Conversion tables, specific heats and other data on gases and vapors, liquids, and solids are also given. *Construction Materials Div., General Electric Co.*

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Gas equipment

Continuous automatic quenching tanks are reviewed in four-page loose-leaf bulletin. It explains how automatic quenching tanks have proven themselves in the past, especially in conjunction with continuous heat treating equipment. Tank is described as an integral unit of sturdy, well-constructed steel plate. It is equipped with variable speed drive conveyor to accommodate handled parts. *American Gas Furnace Co.*

For free copy circle No. 22 on postcard, p. 117

Air-cooled vacuum pumps

Two color bulletin provides quick, comprehensive view of one line of small, air-cooled compound high vacuum pumps. These are offered in six models ranging in size from a ¼ hp unit which has a displacement of 2.0 cfm to a 3 hp unit with a 46.0 cfm displacement. Each pump creates absolute pressures below 0.2 microns, McLeod gauge. Readings of 0.1 micron are said to be typical in blank-end tests. It lists pump construction features and briefly describes operating characteristics. Specifications, dimensions, pumping speed curves and photographs are included. *Kinney Mfg. Div., N. Y. Air Brake Co.*

For free copy circle No. 23 on postcard, p. 117

Industrial shock mountings

All-metal shock and vibration control mountings for smoother, quieter operation of machine tools and other equipment is the subject matter of an eight-page bulletin. A new concept of all metal mountings with stainless steel cushions is explained. It lists company's resilient elements advantages over less durable rubber, cork, felt and synthetics. Methods of fabrication and mounting applications to attenuate vibration are shown for machine tools, mobile television, business office machines and vehicular engines. Illustrations, dimensions and load ranges of tested mounts and their recommended applications are catalogued as well as a review of the design factors, and effects of pieces worked. *Robinson Aviation, Inc.*

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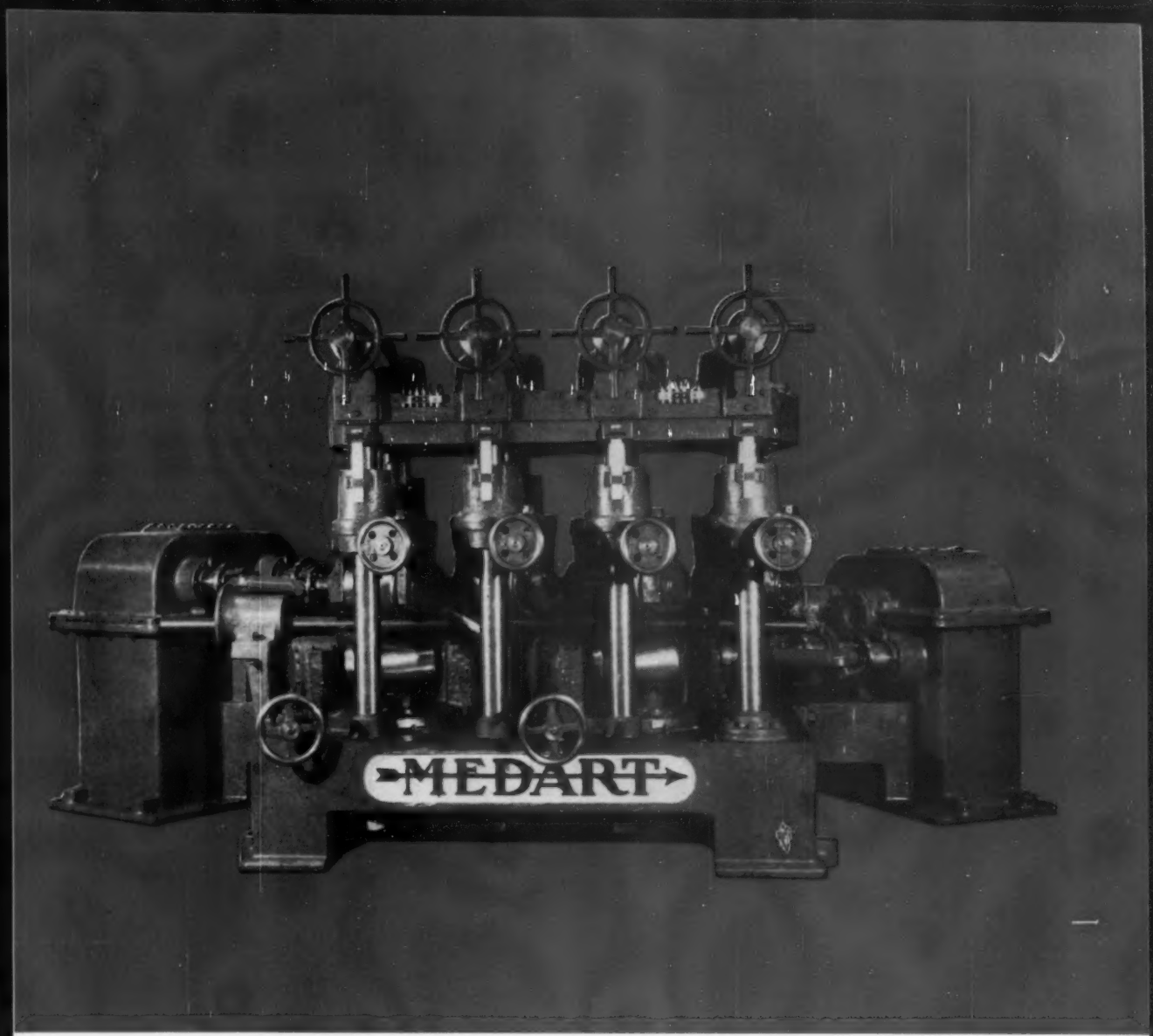

BLAW-KNOX MEDART makes what it takes

for high speed, Multiroll Tube straightening

Developed to meet the requirements of pipe and tube mills, the Blaw-Knox Medart Multicycle Rotary Straightener delivers high speed precision straightening of pipe and tubular products. It differs from other six roll machines in that the sixth roll is also a straightening or bending roll. In conjunction with the middle bending roll, it imposes a duplex straightening cycle on the workpiece.

Unbalanced torque on the workpiece is eliminated since all four feed rolls are driven from a single motor. This insures positive, synchronized feed and torque balance. What's more, this application of balanced torque permits thin wall tubular straightening not possible with other types of machines. Delivery speed is limited only by the condition and properties of the workpiece which may limit the torque and pressure applied.

The Blaw-Knox Medart Multicycle Rotary Straightener is available in all sizes for handling materials in diameters ranging from ¼" to 18". Larger sizes will be designed upon request.

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Welded from 16 gauge sheet this power headstock weighs 28% less than cast iron design. Photo courtesy Oster Manufacturing Company, Cleveland, Ohio.

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FOUNDRY: Core Box Inserts

Beryllium-copper alloy used for core box inserts . . . After producing 20,000, box is described as in excellent condition . . . Production increased an almost unbelievable 1400 pct.

Substitute of beryllium copper alloy in place of aluminum or chromium-plated iron for core box inserts at Lebanon Steel Foundry, Lebanon, Pa., increased the production rate of a cast steel part by an almost unbelievable 1400 pct. In addition, according to the company's pattern planning engineer, Carl K. Shott, they reduced cost of each core by approximately 70 pct, and eliminated all shutdown time required for core box repair.

Design Problem

The foundry obtained these substantial benefits in the mass production of armored steel, louver blade castings for the U. S. Army's M-47 and M-48 tanks. To speed production, the company had purchased two coreblowing machines. Each has a capacity of 700 cores per eight-hour shift. Core box design, however, created very severe wear conditions for metal inserts used. Space between blades was narrow (¾ in.) and in order for sand to form completely in these spaces, blow holes had to be drilled in the core box between each blade. With a hole diameter of ⅜ in., this left only a 3/16 in. clearance between hole and blade on either side.

Abrasive Blasted

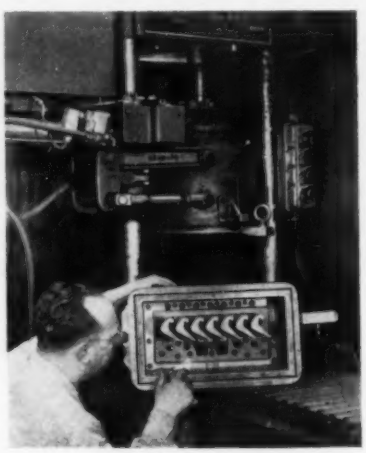
When sand was forced through the blow holes under a pressure of 90 psi, the sides of the metal inserts were blasted with millions of abrasive particles traveling at high velocity. The erosive force was so great that it dished out "bellies" in aluminum inserts after production of only 500 cores. The eroded spots made it impossible to eject the core from the box without damage.

Chromium-plated iron inserts were then tried, but results weren't much better—about 700 or 800 cores before inserts were unusable.

Lebanon made its first beryllium copper-inserted core box in 1952. This box has turned out some 20,000 cores to date and its condition is still described as excellent. According to the core shop foreman it can be expected to produce 20,000 more cores; possibly 40,000 or even 60 000 more. Since 1952, company has purchased over 200 metal inserts made from a special beryllium copper alloy supplied by The Beryllium Corp., Reading, Pa. and every one is still serviceable.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 117. Just indicate the page on which it appears. Be sure to note exactly the information wanted.



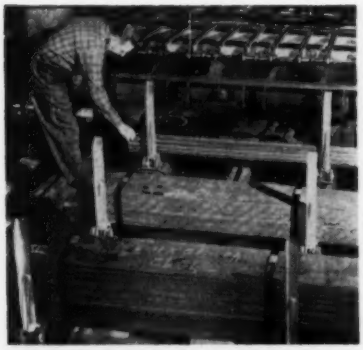
Beryllium-copper alloy was used in these core box inserts.

Handling:

Two new handling machines cut hazards, up output

Two materials handling machines and a worker to check cuttings now put through as much ¾ in. sheared plate at Lukens Steel Company's Coatesville, Pa., plant as used to be processed by three manual operators using a crane and a flat top stacker.

Since they were installed at Lukens, the Liftveyor and the Stationary Stacker, as they are called,



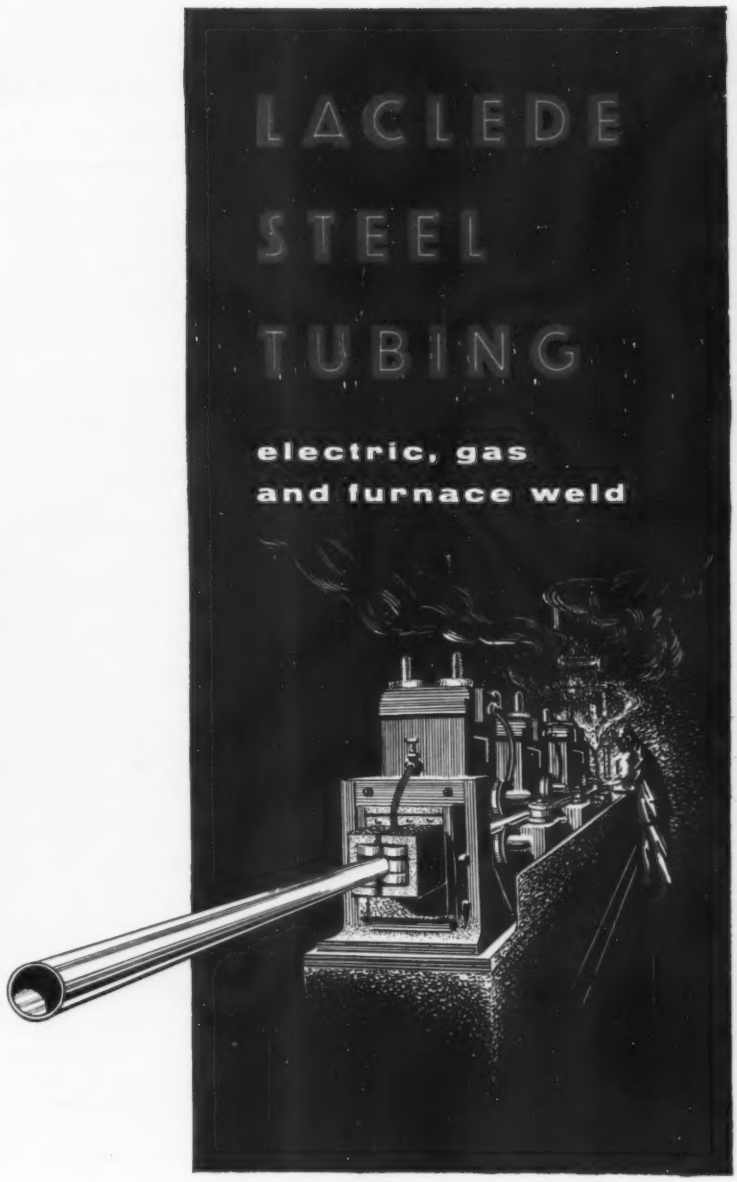
System holds plate while cut, conveys and stacks it.

have, in addition, helped eliminate injuries caused by sharp edged steel plates, falling trim cuts, moving shear blades, overhead cranes and the other hazards present when cuttings are handled manually.

Made by the Fried Steel Equipment Corp., producers of sheet and strip handling equipment, these units work as follows:

The Liftveyor, which in Lukens' case is an extra heavy duty unit, has a set of air-operated plungers that support plate from beneath as it rests against the back gauge of the shear for cutting. When cut plate is put on conveyor chains by supporting arms. Both operations are entirely automatic.

Conveyor chains carry plate from shear bed to stacker. When fully loaded stacking arms automatically roll down to the end of stacker, neatly storing the cut plate. To handle extra quantities of cuttings with no extra effort, additional stacker arms are placed next to the shear.



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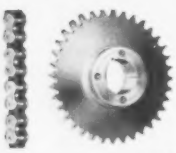

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Elements:

Rare-earth oxides and salts ready for research, use

Availability of a complete line of rare earth oxides and salts of extremely high purity has been announced by officials of Research Chemicals, Inc., Burbank, Calif. Research Chemicals is a subsidiary of Nuclear Corp. of America, Inc., described as one of the leaders in the development and application of advance-design nuclear and electronic products for the sciences and industry.

These rare earth oxides and salts range from lanthenum to lutecium —atomic numbers 57 to 71—and are available for immediate, quantity delivery. Other high purity compounds offered by Research Chemicals are salts of hafium, tantalum, columbium, rubidium and cesium.

Research Chemicals' compounds may be ordered as oxides, acetates, chlorides, nitrates and sulphates. A selection of purities from 98 to 99.9 pct may be specified by the customer.

Company officials stressed the fact that these new products are being found increasingly important in such diversified applications as ceramic production, glass fabrication, phosphor activation, high neutron fluxing compounds, chemical - pharmaceutical oxidation and catalyization.

Galvanizing:

Process is centralized on galvanizing line

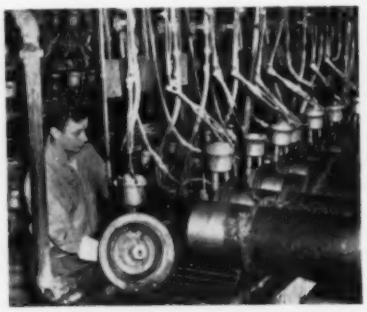
Increased production rates and handling efficiency at the company's Ambridge, Pa., plant has been reported with a new electro-galvanizing line for the internal threads and sealing surface of National Supply Company's extreme line casing and tubing for oil and gas wells.

New plant facilities have centralized a process formerly done at two locations near machining operations. Initially the new operation was handled by one man who operated 20 electro-galvanizing units and manually positioned pipe on the table for galvanizing and removal by overhead crane. A 50 pct increase in through-put has now been made by installation of six additional electro-galvanizing positions and by putting a manual handling helper on the table.

Coated With Zinc

Pipe threads and sealing surface are thinly coated with zinc which serves the primary purpose of having a dissimilar metal on one member of the made up joint to prevent galling during make up. Operation takes from 10 to 30 minutes depending upon pipe size which ranges from 2⅜ to 9⅝ in. OD.

Line casings and tubing are produced by National Supply Company for oil well service and are designed

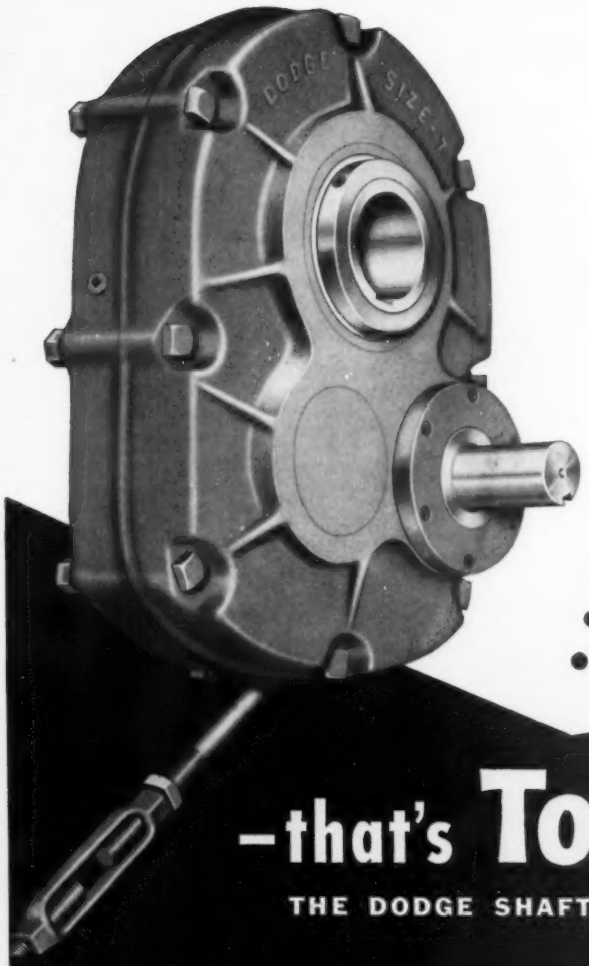


Electrolyte is held by scaling rings and metal hoods.

to withstand extremely severe and variable conditions encountered in high pressure and deep wells. Integral joints on these products are a comparatively new feature which eliminates couplings. Broad, flat-crested threads and seal surface are machined to close dimensional tolerances on a taper that permits fast make and break of joints.

Handling Facilities

New handling facilities for electro-galvanizing consist of a pipe table 72 ft long served by overhead crane. Table consists of four skids, 38½ in. high with overall spacing of 33 ft to accommodate pipe lengths from 18 to 45 ft. Pipe box ends are about 3 in. above work table 45 ft long and 7½ ft wide over which galvanizing is done.



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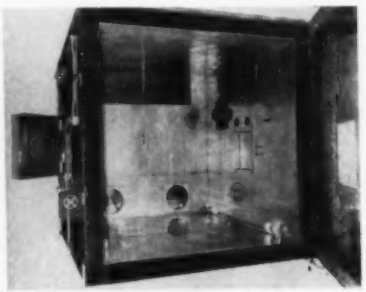
Testing:

Special hinged 20 x 20 in. door solves test problem

This manufacturer of refrigeration and environmental test equipment has just completed construction of an extremely low-temperature environmental test chamber. The firm, Tenney Engineering, Inc., Union, N. J., was faced with the problem of making constant interior adjustments without allowing sharp environmental temperature changes which occurred whenever the major chamber door was opened.

Engineers met this problem with the designing of a special, hinged



Chamber produces temperatures from −100° to +200°.

20 x 20 in. access door located beside the window in one 8 x 10 ft side. This door may be opened to allow manual instrument changes and adjustments without completely dissipating the environmental temperature condition. A 40 hp drive shaft penetrating one side of the chamber is capable of producing from 750 to 4500 rpm. All automatic programming instrumentation allows for complete presetting and pre-selection. This reduces technical operation and observation hours to a minimum.

Low Temperatures

This low-temperature test chamber has a temperature range of −100°F to +220°F. It has a relative humidity range of 20 to 95 pct, 35° to 180°F, 35°F minimum dew point; has a special operation of 5 pct to +160°F; has a heat dissipation load of 30,000 Btu/hr. at −70°F and/or 3,000 Btu/hr. at −100°F.

Physical interior dimensions of this unit are: 8 wide x 8 high x 10 ft deep. Provision was made for 200 lbs per sq ft floor loading. Two 3 in. ports under each window on the long side were also supplied.

Alloys:

Nickel alloys of two types for turbine application

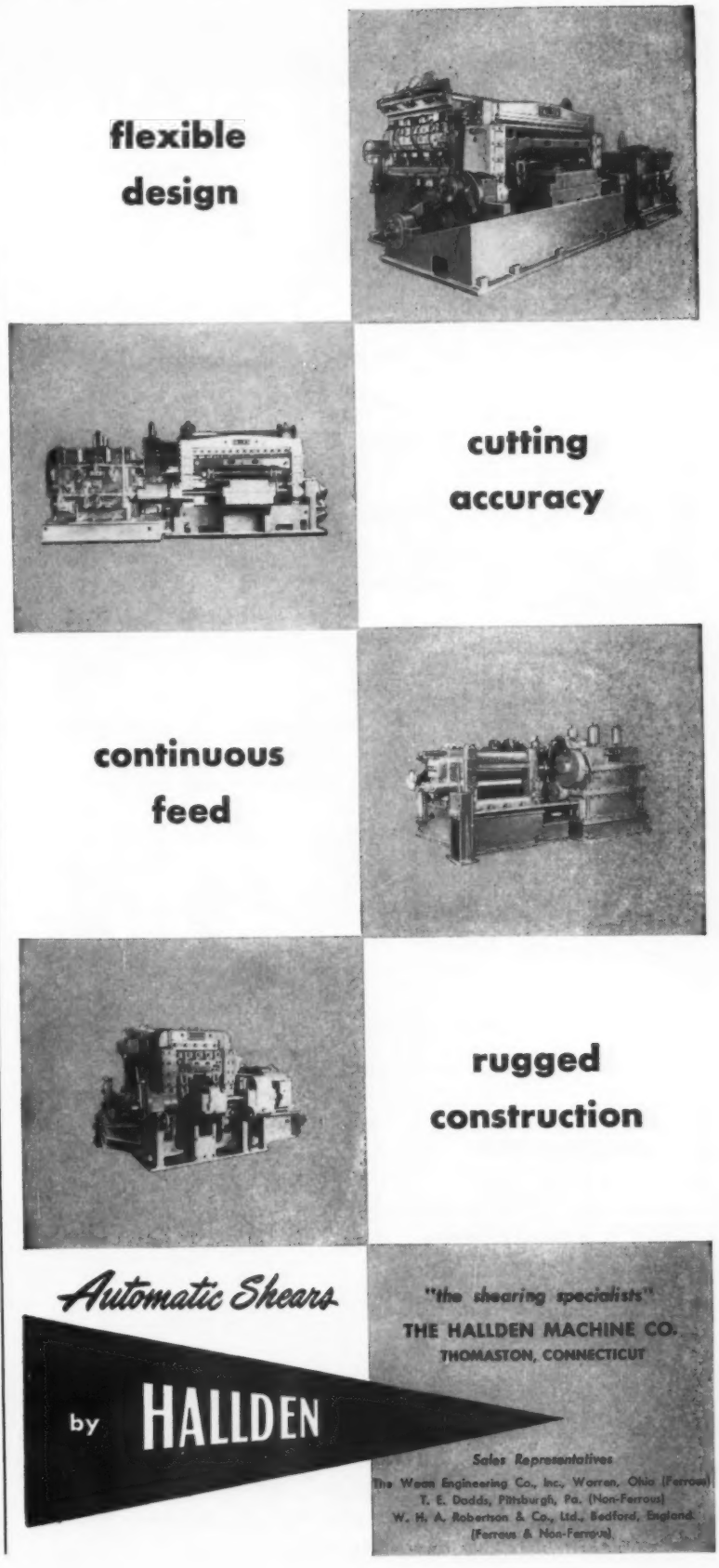
Two new high temperature alloys for aircraft and industrial gas turbine applications include an age-hardenable nickel-cobalt-chromium alloy, containing approximately 50 pct nickel and 30 pct cobalt. This new alloy, a modification of International Nickel Company's Inconel "X" high temperature alloy, was developed for designers seeking adequate strength for forged aircraft gas turbine blades at temperatures up to 1650°F. A metal was required that could operate at a working temperature approximately 150°F. higher than the Inconel "X" alloy.

This alloy is now produced as hot rolled rounds in the size range of $\frac{5}{8}$ in. to two in. diam. All rods are furnished with a turned or ground finish. A small amount of cold rolled sheet has been produced experimentally. The mechanical properties of the Inconel "700" alloy at 1650°F are similar to those of Inconel "X" at 1500°F. It has enabled aircraft engine builders to increase current engine performance or to plan design of future engines to operate at higher temperature range.

High Creep Strength

The second new product, Incoloy "901" nickel-iron-chromium alloy, has been developed for use in aircraft and industrial gas turbines for those components requiring high creep and rupture strength in the temperature range of 1000 to 1400°F. At these temperatures, the Incoloy "901" alloy has properties that compare favorably with those of the "super" alloys yet is low in strategic alloy content.

An important physical property is its low co-efficient of thermal expansion. Containing approximate-



ly 40 pct nickel, it is close enough to ferritic alloy steels to permit the two materials to be joined without special thermal expansion provision. In addition to bar and forging stock, it is also produced as sheet in the same sizes and gauges as those offered in Inconel "X" and Inconel "W" alloys.

Incoloy "901" is expected to find wide application for use in turbine rotor and compressor discs and structural parts.

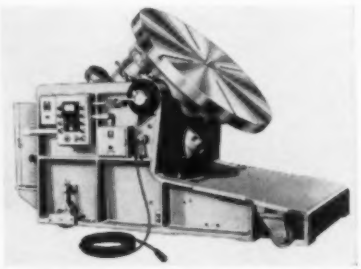
Welding:

Precision positioner has 4000 lb capacity

Production of high quality, jet engine weldments capable of satisfying rigid aircraft quality control standards has placed new demands on designers and manufacturers of precision welding positioners.

The Weldma Company of West Hartford, Conn., has developed, to meet these demands, a newly designed circumferential welding positioner of 4000 lb capacity.

Its positioner frame, mounted on grooved casters, is of ribbed cast iron construction for strength and rigidity. The 52 in. diam keyed face plate with center locating pin is set in a large Timken bearing to eliminate drag and is driven by a gear reduction motor. Extremely smooth and constant power transmission is claimed by a carefully designed worm gear and worm wheel mechanism. Acceleration from zero to maximum speed adjustable to seconds. Deceleration from maximum speed to zero adjustable to seconds. Variable speed regulation at a 100 to 1 ratio from zero to 2 rpm is electronically controlled and readily adjusted at a centrally located control panel. Well designed helical segment gears and tilting mechanism assure angular adjustments up to 105°. A remote control switch is included for the operator's convenience. Indicator gauges, clearly graduated to record faceplate speed and degree of angular tilt, are located in the central control panel for convenient and immediate observation.



Locating pin mounted on bearing at center of 52 in. face plate.

Methods:

Mass production operations adopted to small output

That low production operations can be made to benefit from tooling research and application commonly associated primarily with mass production was illustrated recently at Hyster Company, Peoria, producers of tractor mounted equipment.

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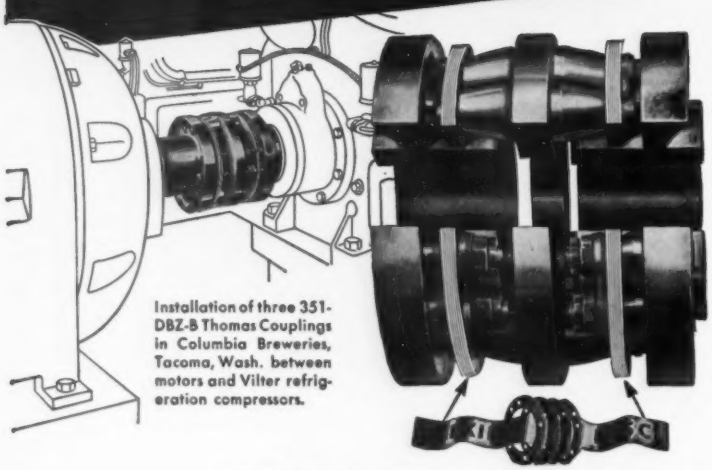

Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

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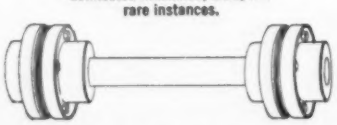
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.



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Naturally the boss was plenty happy about it. Happy, did I say? That's putting it mildly! That extra dough on my pay check speaks louder than words. He was downright *enthusiastic!*

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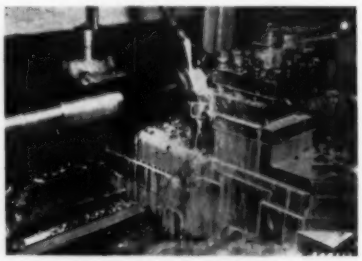
Among parts involved were a cast steel drum for hoists, forged steel and cast steel shafts. The drum is machined on a Bullard. Production was 1.27 pieces per hr. Tool cost for facing and turning the flange, rough facing and turning the drum hub and finish facing and turning the hub, was 47c per part. A good deal of this was due to the relatively short life of the tools between grinds. Four pieces were average for the flange machining and roughing the hub.

As the result of tooling research, consumption tool cost for these same operations has been said to reduce about one cent per piece pro-



Separate facing, turning holders upped tool life, machine speed.

duced, while output has raised 30 pct due to a further 85 pct reduction in down time for each tool change. Tool cost per piece figures do not include holders which company says are semi-permanent in character.

Tools now used for these operations are Wesson Multicut holders with indexable type inserts.

Performance Improved

Improvement in performance was obtained without resorting to special grades. Both Wessonmetal WM and WH grades are standard. Similar results were experienced in machining shafts on a Warner & Swasey 2A lathe. On the forged shaft (280Bhn), tool life was boosted approximately 400 pct and output increased 18 pct by a Multicut tool with a Wessonmetal WM insert. In addition, this tool can be used for both roughing and finishing cuts. The former tool used for roughing only had a life of two pieces. New one takes care

of 7 pieces for both operations.

On the cast steel shaft (240Bhn) Wessonmetal WS grade is now used in the form of indexable inserts in both facing and turning tools. Here the production was said to gain 20 pct and tool life was increased 300 pct for one tool and 600 pct for the other. Former turning tools had handled four pieces per grind but tools had to be changed more frequently than this since facing tool life was only two pieces per grind. With new tools, tool life is 12 pieces per grind for both tools.

Production:

Insurance given against future obsolescence

A design principle which gives the manufacturer full advantage of transfer press economy on a variety of work allows presses to change over from running one part to another with a minimum of effort.

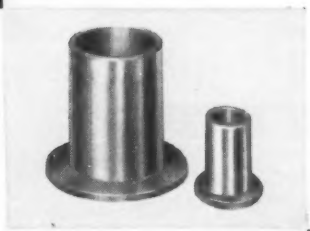
Transfer machines, whether presses, or the type of combination, multi-purpose machines that produce engine blocks, have always, of necessity been designed for long-run jobs. Where a single part is required in large quantities it becomes practical to tool up to produce that part automatically with specially built machinery. However, any company making the decision to invest in automatic equipment has had to take a calculated risk. Changes in product design or even lack of demand for that particular product can quickly change a costly automatic machine from an asset to a liability.

Press quartet may be added to or each used individually.

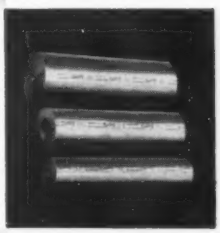
SINTERED POWDERED BRONZE BEARINGS AT THEIR *most modern best!*

Bunting's many years of experience in the manufacture and distribution of Cast Bronze Bearings gives the highest standards of precision, quality and worth to the new Bunting stock sintered Bronze Bearings. These better sintered bronze products are now available from Bunting Distributors.

Bunting's research facilities and resources are producing quality, precision and unvarying uniformity in self-lubricating bearings made of sintered powdered bronze. Plain bearings, flange bearings, thrust bearings and bars made of this increasingly popular material now can be had in sizes and standards not heretofore available from stock.



BOTH Bunting Cast Bronze and Bunting oil filled, self-lubricating sintered powdered Bronze Bearings and Bars are available to you through your nearest Bunting Distributor. He has in stock all sizes for your immediate needs. Ask him or write for complete lists and dimensional data on Bunting Cast Bronze and Bunting Sintered Bronze Bearings.



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BUSHINGS, BEARINGS, BARS AND SPECIAL PARTS OF CAST BRONZE AND POWDERED METAL

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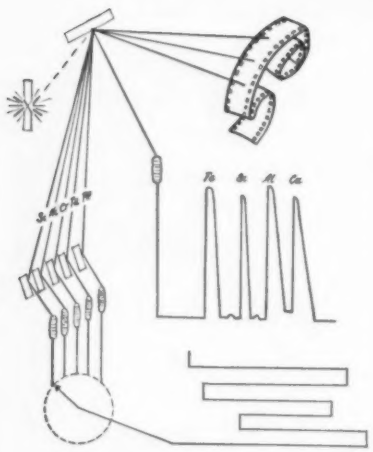
Now... ANY SIZE LABORATORY CAN BE VERSATILE

WITH THE 3-IN-I

ARL QUANTOGRAPH*

Provides high-speed qualitative and quantitative analysis of miscellaneous samples by means of photographic recording of spectra; universal sequential, direct-reading analysis of virtually any element in any matrix; and finally, the highest speed, direct-reading analysis of similar types of sample for a semifixed group of elements. Any of these features can be provided in the initial instrument or easily added as the need arises. Whatever your analytical problems, you'll want full information on the Quantograph*, and on ARL's full line of optical emmission and x-ray analytical instruments. Service and counsel are always available from an ARL field office near you.

3 instruments in 1



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Simultaneous analysis of many elements • Highest speed operation • Internal standard control • Highest precision

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Automatic presses in order to be a practical investment must be adaptable to produce different products or remodeled versions of existing products, according to the Clearing Mach. Corp. Furthermore, they must be designed so that a manufacturer has insurance against long-range obsolescence by being able to alter the physical characteristics of the press, if necessary. One answer to these problems was development by Clearing of multiple-purpose automatic presses. Known as Transflex presses, they offer equipment that will continue to remain useful in spite of design changes in the product manufactured. In addition, these presses are not single purpose machines. They are designed to be used to produce a number of different parts and to be changed over from one job to another quickly and easily. Transflex presses are claimed so versatile that job stamping shops, with variegated production requirements, can take advantage of them.

Variable Length of Feed

Flexibility of the presses is obtained by making those features of the press that need to be changed when different parts are run, adjustable.

Automatic feed that carries the piecepart through the press has been designed so that feed stroke is adjustable. Adjustments are provided so that feed fingers can be quickly respaced along the feed bar to accommodate varying feed lengths.

Construction:

Building exterior Porcelain; Titanium outside next?

Building exteriors of steel, glass, brick, stone, wood, aluminum and poured plastics are commonplace in New York City. An outside wall of titanium can now be imagined because the next thing to it has already been built—an exterior of gleaming porcelain.

The first seven-story building in New York City to use porcelain

enamel throughout its exterior is a new parking garage on West 57th Street.

Porcelain enameled panels, manufactured and installed by Architectural Porcelain Fabricators, Inc., Bronx, N. Y., were applied directly to horizontal steel angle irons, top and bottom, with no masonry or brick backing. Four hundred seventy-five fluted curtain-wall panels were made for the building. Each panel is 38x42 in. in size.

Colorful and Economical

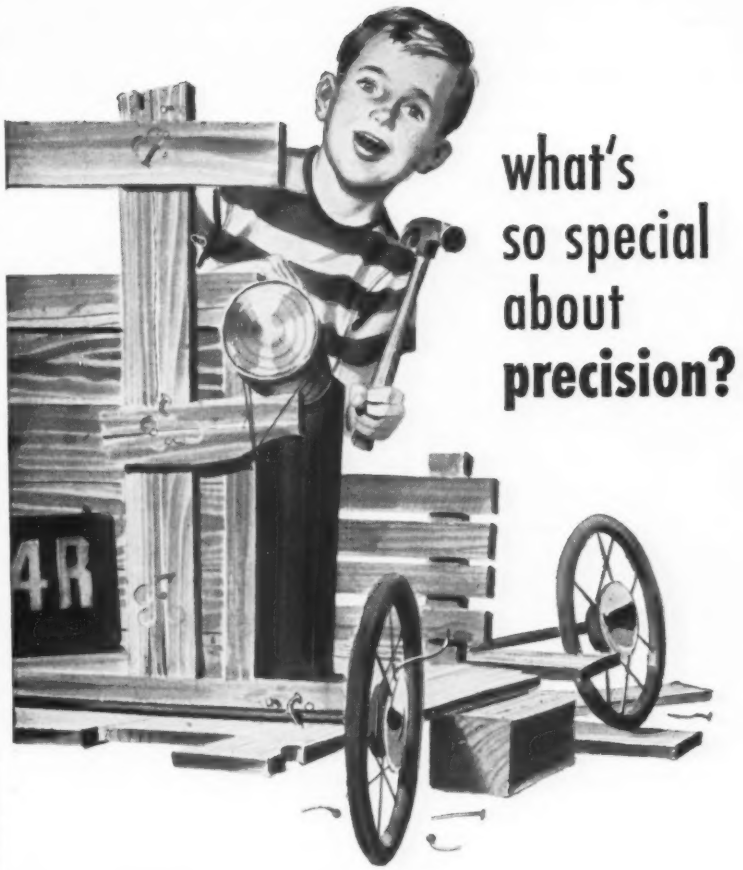
These porcelain-on-steel panels provide a colorful as well as economical curtain wall with its two-tone finish in a cream color overspray on a green background. Outstanding advantages include self-cleansing properties, durability, low maintenance cost and ability to weather well.

Manufacturer reports that a similar exterior was recently installed on a block-long four-story building in Providence, Rhode Island. In the first months of this year, the firm states, the volume of business it has done in making and installing porcelain-on-steel architectural panels is more than double that of the corresponding months of the preceding year. Interest in this type of installation has grown to such an extent that orders now on hand are necessitating an expansion of facilities.

Joining:

Cold welding done with epoxy resin material

Hazards and difficulties involved in making welded repairs to metal tanks, pipes, and conduit have long been troublesome in many industries. This has been especially true where flammable materials are being handled and complete evacuation of all liquids, gases, or powders becomes necessary before welding can be started. A method for making such repairs without welding, using a newly developed filled epoxy resin material called Sonite and glass cloth, has now been reported by the Smooth-On Mfg. Co., makers of iron cements for 60 yr.



what's so special about precision?

To this little fellow building the 1956 "dream car", precision is a bent nail or a split board. To modern automotive engines and aircraft power plants, PRECISION is a most important element.

That is why CHANDLER specialists are working harder than ever to supply cap screws to closer tolerances to meet your new requirements. Chandler is producing the finest fasteners today in all of its 25 years of experience. Chandler is specializing in mass production of bolts from high alloy steels . . . with special heads or threads . . . with drilled heads or shanks . . . ground to close tolerances . . . and with threads rolled after heat treating.

There is a Chandler cold wrought fastener to meet your specifications. And remember, at Chandler . . . there is nothing special about PRECISION because we do it every day.

6363-CH

Write today for Bulletin 1264-CH

CHANDLER PRODUCTS CORPORATION

1434 CHARDON ROAD • CLEVELAND 17, OHIO

Patches made in this way have been tested to over 1,000 psi for extended periods without failure. Corroded or broken out areas, split seams, breaks, and porous areas can be quickly, easily, and effectively repaired in tanks, pipes, or conduit handling gasoline, fuel and lube oils, acids, alkalis, and, in fact, practically any liquid, gas, or powdered material.

White Or Aluminum

Sonite is said to have great chemical stability and good adhesion to metals. It is oil and waterproof, resists acids and alkalis, and will withstand temperatures to 200°F. It is available in white and aluminum.

Repair Kit contains all needed materials, including glass cloth, stirring paddles, brush and brush cleaner, and the compound.

First hole and surrounding areas are cleaned down to bare, firm metal and washed with the brush cleaner to remove all oil and grease. When metal is dry, a primer, supplied with the repair kit, is mixed and painted onto the patching area and allowed to get tacky-hard. This takes about a half-hour at 70°F. Then a glass cloth patch of the proper size is placed into position and pressed into the prime coat.

Mixed according to directions the material is painted over the glass cloth, making certain that it is brushed over the patch edges.

Glass cloth is painted with a resin to get a cold "weld."

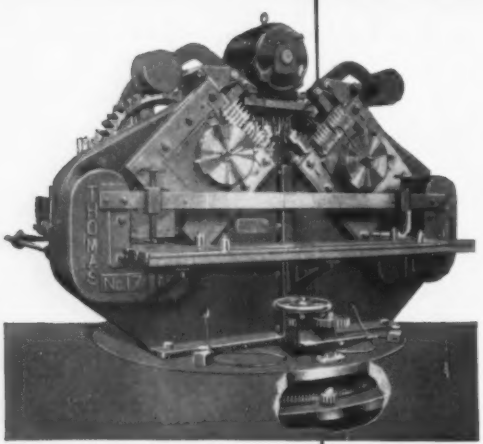
A second patch is then placed over the first and the painting operation repeated. Two glass cloth layers will take care of a hole in a small tank or pipe; three or four are recommended for large tanks or pipes, or for use with acids or alkalis.

Can Be Sanded Smooth

A neater job results if successive patches are cut slightly larger, thus feathering the edges as the patching progresses. If desired, the completed and hardened patch can be filed or sanded smooth, company says. Patch will harden and the tank or pipe can be used in 18 hours at room temperatures. External heat from any source must be applied if the hardening is to take place properly in cold weather, or if the situation requires a faster cure.

the trend is to THOMAS

double angle shears



The inbuilt quality and ruggedness of Thomas double angle shears insure years of trouble free service with a minimum of maintenance.

If you have a need for "high production" shearing of angles it will pay you to investigate Thomas.

Sizes are built for angles up to 8x8x1¼", with or without turn-table.

WRITE FOR BULLETIN 310-A

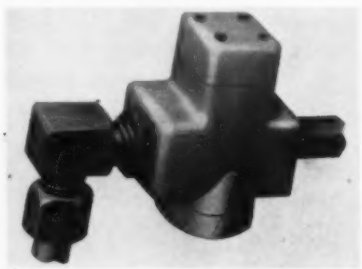
Punches • Shears • Presses
Spacing Tables • Benders

THOMAS
MACHINE MANUFACTURING CO.
PITTSBURGH 23, PA.

Fastening:

Pipe connections sealed without sticky goo

A new seal-fitting that eliminates leaks at pipe thread connections without need of messy, sticky, seal compounds has been introduced by the Tru-Seal Div. of the Flick-Reedy Corp., Melrose Park, Ill., also the parent company of the Miller Fluid Power Div., power cylinder manufacturer.



Pipe thread seal-fitting is not messy or sticky.

The new seal-fitting is said to be quickly, easily installed merely by (1) threading it on pipe or fitting, (2) threading pipe or fitting "hand tight" to desired position in port, (3) tightening Tru-

NOW...

an EXTERNALLY WRENCHED SCREW

that can be used in *standard*
counterbored holes with *standard* wrenches

THE FERRY CAP

countr-bor®

SCREW

For counterbored or other socket head screw applications, external wrenching instead of internal wrenching means:

- **More gripping surface**
- **More torque**
- **More savings**

TRY THEM—

Save knuckles—save time—save costs.

Solve simply the tough assembly problems and improve appearance where socket screws are required.

Send for samples.

You'll receive prices, complete information and samples promptly upon request.

Any type socket wrench handle with standard 12-pt. socket is used for counterbored applications.

Ferry Cap Countr-Bor Screws
PATENT APPLIED FOR
MANUFACTURED SOLELY BY

THE FERRY CAP & SET SCREW COMPANY
2157 SCRANTON ROAD • CLEVELAND 13, OHIO

Ask Standard ... how to cut costs with conveyors

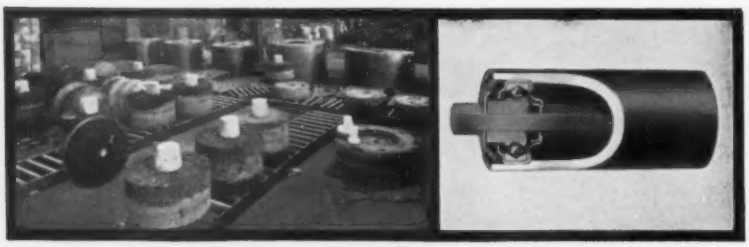
Typical pouring floor with molds on parallel lines of roller conveyors.

Use our specialized experience to good advantage in your foundry

STANDARD Conveyor Company has a record of 50 years of service to foundries and allied industries. This experience can be put to work to help you cut your costs . . . simplify material handling . . . free expensive manpower.

Here's your opportunity to get a perfect combination of long, dependable service with maximum flexibility. Quality-built Standard units are offered in a wide range of stock types and sizes that allow custom-engineering at standard unit prices.

Before you invest in new equipment, get the facts from Standard on powered as well as gravity conveyors in both permanent and portable models. STANDARD CONVEYOR COMPANY, General Offices: North St. Paul 9, Minnesota. Sales and Service in Principal Cities.



Standard Roller Conveyors feature especially-designed shielded bearings. On the job, shields keep out spillage and sand, give longer, trouble-free roller life.

For details, see the Standard Engineer listed in the phone book or write for Bulletin 309. Address Dept. M-6.

Sales and Service in Principal Cities.

Seal down against pipe or fitting with only light torque required. According to the manufacturer, it immediately stops leaks in old installations, insures leakproof operation at pipe thread connections of new installations.

Other advantages claimed:

It is designed for use on any pipe thread, dry seal or standard; for all piping installations; for use on oil, water, air, gas, steam, vacuum and chemical fluid lines (except lines carrying fluorine gas or molten alkaline metals); for operating temperatures of —280° F to plus 500° F.; for pressures up to 3,000 psi (15,000 psi minimum proof pressure).

Where Recommended

It is recommended for applications where leakproof operation is absolutely essential; where pipe compounds might impair circuit operation; where space limits the use of large or long pipe wrenches; and on fittings that require frequent take-down and re-assembly.

It is said to eliminate the danger of stripped threads and cracked or distorted castings caused by the overtightening of conventional leaky joints.

It can be additionally tightened without disturbing the piping. It eliminates special fittings.

Die Casting:

Air pre-cleaners handled on job shop die caster

To eliminate a costly production snag, the Donaldson Company, St. Paul, Minn., turned to a job shop die caster to solve a problem in manufacturing air pre-cleaners. Donaldson formerly made these units by fabricating sheet metal parts and welding them together. Now, by redesigning to die casting, the snag was eliminated.

Heart of the problem was the multiple welding operation on the pre-cleaner's intake vanes. Having previously produced large quantities of these units from sheet

metal, Donaldson attempted to redesign a new sheet metal fabrication, but all efforts to eliminate the welding problem proved too costly. Consequently, Donaldson turned to die casting.

A New Problem

That the pre-cleaner parts could be die cast and eliminate welding, was not doubted. Whether costs could be lowered and still produce the three different diam die castings required, was a new problem. Requirements for pre-cleaners make it necessary to produce the same part with three different diameters of the center tube. On vehicles such as farm tractors,

Pre-cleaner mounts on intake of heavy duty air cleaners.

pre-cleaners are mounted on the intake tube of heavy duty air cleaners to remove most dirt from the air before it enters the heavy duty cleaner.

Suggestion Made

At the suggestion of a local job shop die caster (a member of the American Die Casting Institute), engineers agreed to the use of interchangeable cores in the die. This decision eliminated the need for three separate and costly dies. When the production costs of the new certified zinc (ASTM Spec. XXIII) die cast component were tallied, Donaldson discovered that they were 33 pct under the sheet metal fabrication. A certified zinc die casting was chosen because of its strength characteristics, and the ability of the die casting process to mass-produce a tested design to close tolerances.

THE FINISHING TOUCH

LOWER YOUR COSTS IN PLATING

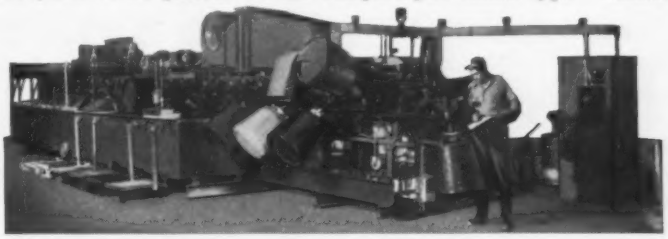
by Guy A. Cummings
Metal Finishing Sales Manager
FREDERIC B. STEVENS, INC.

How Modern Equipment Can Improve Your Operations

Judging from the vast number of quotations on automatic equipment for electroplating, anodizing and processing being made each month at Stevens, we know the interest in automatic equipment has never been higher. To meet competitive prices, improve finishes and lower labor costs, metal finishers are constantly challenged to make modern improvements in their operations. Usually this means more modern equipment.

Let us tell you how the Stevens Automatic Barrel Plating Machines can help you. They are used for zinc, cadmium, nickel, brass plating of such small parts as screws, bolts, nuts and stampings, and also a wide variety of bulk immersion processes such as phosphatizing, washing, pickling, and chromating.

We have been making these machines for a long long time—hundreds are in operation—so you can be confident that there are no mechanical bugs. They are simple to operate—feature automatic unloading—and when equipped with automatic load devices, several machines can be operated by only one man. The cylinders which take the parts to be plated are the oblique open ended type—without



covers. By raising or lowering the cylinder the parts slide in and out without the necessity of unclamping and removing covers normally needed for horizontal type cylinders.

The Stevens simple compact design makes it economically feasible to purchase production capacities as high as 4000 pounds per hour in one machine, or just as practical to distribute the capacity between two or more machines to provide flexibility in plating thickness, production, etc.

Here are other advantages in using Stevens Automatic Barrel Machines—uniformity of deposit, fewer rejects, better working conditions, easier chemical control, better scheduling and delivery and *lower costs per piece.*

The selection of the right equipment, the capital investment required, the arrangement of your plant to install the equipment are important considerations. Frederic B. Stevens, Inc., with its long experience in the metal finishing field has made many analyses of this kind. We can help you too.

Write to Frederic B. Stevens, Inc., 1808 18th Street, Detroit 16, Michigan.

FREDERIC B. STEVENS INCORPORATED
YOUR METAL FINISHING SUPERMARKET
DETROIT 16, MICHIGAN

METAL FINISHING EQUIPMENT AND SUPPLIES FROM CASTINGS OR STAMPINGS TO FINISHED PRODUCT

BRANCHES:
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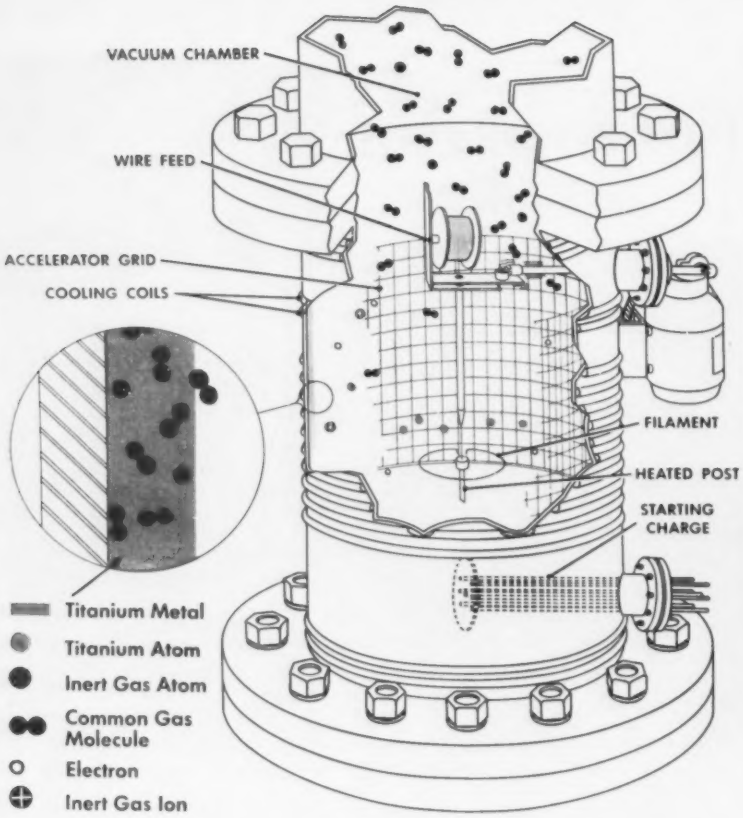


the pump with **no outlet**

This unique pump—the Evapor-ion—removes many millions of times its own volume of air from a system—yet it has no outlet.

As shown above, pure titanium wire is fed onto a post heated by electron bombardment from the filament. The titanium evaporates and, upon striking the cooled pump wall, condenses as a thin layer.

Gas molecules wander into the pump from the vacuum chamber and move aimlessly about. Eventually they strike the titanium layer.

Molecules of the active gases, which comprise over 99% of the air, are held as compounds by the titanium. As each layer of titanium becomes chemically saturated, a fresh layer of metal is deposited.

The inert gases do not combine chemically with the titanium. Some of the electrons emitted by the filament collide with and ionize the inert gas molecules. The electrical field of the accelerator grid violently repulses these positive ions and drives them into the titanium layer. Here they are buried by subsequent titanium evaporation.

This constant removal of air molecules by evaporation and ionization constitutes a pumping action. The Evapor-ion pump produces a vacuum in the range from 10^{-4} to 10^{-9}mm Hg, uncontaminated by the fluids used in conventional pumps. Nitrogen is pumped at speeds as high as 2000 liters per second.

The Evapor-ion is ideal for noncyclic vacuum systems such as betatrons, synchrotrons and other particle accelerators. In addition it has potential applications in the fields of metallurgy, electronics and metallizing.

For further information, write for data sheet No. 6-140-Z1.

CVC **Consolidated Vacuum**
Rochester 3, N. Y.
a division of **CONSOLIDATED ELECTRODYNAMICS CORPORATION,** *Pasadena, California*
Sales Offices: Albuquerque • Atlanta • Boston • Buffalo • Chicago • Dallas • Detroit
New York • Pasadena • Philadelphia • San Francisco • Seattle • Washington, D.C.

Maintenance:

Two sandblasters may blast from same supply pot

Two sandblasters may now blast from one pot. The latest continuous action machine manufactured by Clementina, Ltd., is equipped with two blast hoses working off two sand control valves. These machines are double chamber types holding 1,000 lb of sand with automatic pop-up filling valves and 1¼ in. piping. All blasting is done from the bottom chamber which permits refilling of the upper chamber without interrupting the sandblasting. The abrasive in the upper chamber automatically transfers to the lower chamber. Mounted on three legs and equipped with lifting ears these units are designed for the large scale users. If desired only one hose can be operated.

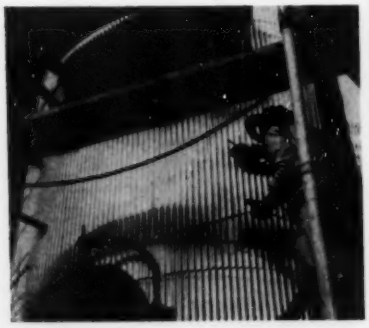
Two sandblasters operate from a single supply pot.

Materials:

Corrugated aluminum jacketing gives 97 pct more strength

Deep-corrugated aluminum jacketing for tanks, towers and vessels has been introduced, which, according to the makers, Childers Mfg. Co., Houston, Tex., makes it possible to do an all-aluminum jacketing job on any installation. Appearance is said to be improved. Installation costs are described as cut due to lower first cost and cutting and handling ease. Aluminum jacketing is sometimes attached with aluminum strapping and seals, or with aluminum sheet metal screws.

Jacketing has been produced with 1¼ or 2½ in. corrugations. Rigidity is increased by cross crimping aluminum before adding deep corrugations. Cross crimping adds up to 97 pct greater strength over plain corrugated aluminum, company reports.



Deep-corrugated aluminum jacketing is handled with ease.

A new factory-applied moisture barrier added to jacketing eliminates corrosion from within, providing a virtually permanent jacketing job. Moisture barrier eliminates a costly step in pipe and tank jacketing. The 15 lb felt wrapping, formerly used in installations, is no longer necessary.

Controls:

Electronic devices control air temperatures

Electronic devices that utilize minute electrical charges in the air to control the temperature and level in the manufacturing of many industrial and consumer products have been demonstrated.

Fielden Instrument Div. of Robertshaw-Fulton Controls Co., says the instruments operate on the principle of electrical capacitance, or measuring changes in the invisible electrical field located between the specimen and the electrode of the instrument. This electrical field is set up in the air by the instrument, which then accurately measures any changes in it.

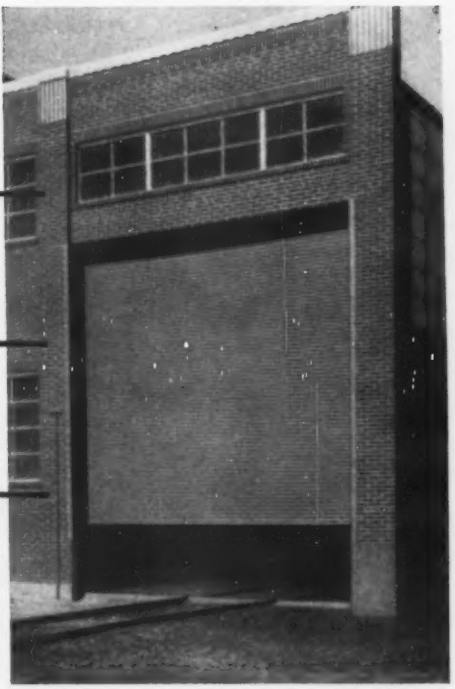
Used in situations demanding a

Doors open straight upward--no space is wasted anywhere

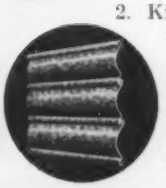
Maximum protection against theft, riot intrusion, vandalism

Every door is REGISTERED[1] for your protection

Extra-heavy zinc coating, for lasting weather resistance[2]



Kinnear Rolling Doors



You get *more* protection plus *more* efficiency in Kinnear Rolling Doors. Coiling above the doorway, they open out of the way! They never block light from close-by windows or fixtures. No floor, wall, or ceiling space is sacrificed. Hoists, conveyors, high-lift fork trucks and similar equipment can be used to maximum advantage.

1. Details on every Kinnear door are REGISTERED—kept in fire-safe vaults. Damaged or worn parts are *permanently* replaceable. Your Kinnear Door is never "orphaned."
2. Kinnear's rugged interlocking-slat curtain is heavily galvanized (1.25 ounces of pure zinc per sq. ft., A.S.T.M. Standards). In addition, the special Kinnear Paint Bond assures immediate, thorough coverage and adhesion of field-applied paint.

Kinnear Rolling Doors are engineered to fit any need, with manual-lift, crank, chain or electrical operation. Controls for motorized doors can be placed at any number of convenient spots. For long, low-cost service, insist on Kinnear Rolling Doors! *Write for catalog.*

The KINNEAR Mfg. Co.
FACTORIES
1760-80 Fields Ave., Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.

KINNEAR ROLLING DOORS
Saving Ways in Doorways

THERMALLOY* quality control at work

obstacle course

How we take the guess-work out of casting quality

At our Elyria Plant, a thorough testing of all castings is conducted by our staff of trained X-ray, chemical and metallurgical technicians to make sure that all Thermalloy castings are of the highest quality.

The broad background of our technical staff, and its record of successfully solving heat-resistance problems, can help you minimize maintenance costs and eliminate expensive breakdowns.

Electro-Alloys offers you a complete research and quality control service that will insure you trouble-free castings.

Let us put our facilities to work to solve your heat-treat problems — call your local Electro-Alloys representative or write for a copy of booklet T-225, *Thermalloy Heat-Resistant Castings Give Longer Service Life*. Electro-Alloys Division, 7016 Taylor Street, Elyria, Ohio.

*Reg. U.S. Pat. Off.—designating not just one but a "group" of alloys —each developed to meet a specific heat and abrasion problem.

HEAT-RESISTANT CASTINGS • TRAYS • MUFFLES RETORTS • CONVEYOR BELTS • RADIANT TUBES

AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION
Elyria, Ohio

high degree of accuracy, some capacitance-type instruments can determine variations as small as 0.000001 in. or temperature changes of 0.001°.

One electronic device is designed to control the temperature in as many as 100 different steps of a manufacturing process. Should

Briefing on the new instruments is a firm representative.

trouble develop in the process, the device will stop the production line, signal an attendant and locate the difficulty. It can also be set up to bring about self correcting action automatically.

Another of the instruments called a multipoint recorder is capable of putting down on a 12 in. circular chart, electronic impulses received from 96 remote sources.

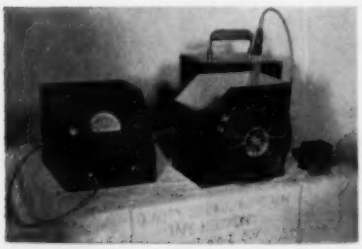
Electronics:

Double metal construction protects magnetic tapes

Shielding of magnetic tape from high and low intensity fields causing double sound, echo, partial or full erasure has always been a problem to those using tape recording in industry.

An entirely new type of protective carrying and storage container which completely shields tape recordings from such things and also shields delicate instruments in government and other laboratories, has just been developed by Magnetic Shield Div., Perfection Mica Co., Chicago, Ill. The container is available in a variety of sizes and shapes to fit any desired application.

Double metal construction consists of two layers of specially prepared magnetic shielding steel, known as Fernetic, which attenuates high intensities and Co-Netic which attenuates low intensities, company says. In double metal construction the Fernetic layer must be placed closest to the magnetic field and the Co-Netic layer closest to the item being protected. The layers are rendered non-shock sensitive by coating both sides of each layer with specially developed ferrous and ferrite powders which raise the metal's saturation point considerably. This permits the manufacturer to magnetically test each container during final inspection without saturating it and thereby rendering it useless.



Meter shows no magnetic field inside shielded container.

Extremely high saturation point and non-shock sensitive features are said to insure lasting safety to tape recordings and delicate instruments from many disturbing fields. Such fields include those caused by power machinery, motors on air conditioners, fans, vacuum cleaners, washers, driers, mixers, sewing machines and other electrical appliances as well as fields caused by testing apparatus and transformers on radio and TV sets.

Coating:

Ceramic finish circulating system is hailed

Performance of a circulating system for ceramic finishes has been identified as operating successfully under shop conditions in the Hotpoint Company's Chicago plant since April 1955.

JOT NAME, TITLE AND ADDRESS IN THIS SPACE
TO START YOUR FREE "NELWELDER" SUBSCRIPTION

Complete photo of this Texas cowhand appears on the front cover of the July NELWELDER, industry's magazine of stud welding.

NELWELD

when you're talkin' studs..

NELSON IS YOUR BRAND

Fixin' to cut product costs? Building costs? Then round up your designers and steer them toward end welding studs to steel, NELSON style.

From securing cover plates on a product to the fastening of industrial roofing and siding materials on a building, the NELWELD® method can save you big money. The studs are available in a wide range of shapes, and in sizes up to 1 inch diameter.

Corral your local NELSON field engineer, Pardner, he's a right smart hombre when it comes to studdin' around for fastening short cuts. Get on the mailing list pronto for the NELWELDER. Sign up in space above.

NELSON STUD WELDING
Division of Gregory Industries, Inc.
LORAIN, OHIO

Planning **THE SHAPE** *of things* **TO COME**

MANY GOOD NEW PRODUCTS coming off the drawing board will be better and cost less because Ⓑ Special Fasteners are included in their design. By paying attention to this one relatively small detail, manufacturers are able to cut assembly costs; produce products that meet and beat competition.

THAT'S WHY it will pay you to discuss your fastener problems with an experienced concern such as Buffalo Bolt. Simply phone or write one of our offices. No obligation, of course.

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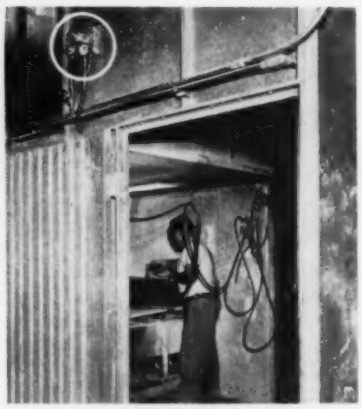
Many **GOOD** *products can be made* **BETTER** *...with* Ⓑ **SPECIAL FASTENERS**

This system has been enthusiastically acclaimed by Hotpoint officials. Particularly, they praised a new model ceramic regulator which they say, "Has opened the way to higher quality and better manufacturing here at Hotpoint."

Described as efficient and trouble-free, this regulator for ceramic materials and glazes was developed by the Binks Mfg. Co., Chicago, Ill. Lack of one has been the principal deterrent to practical circulating systems for ceramic materials in the porcelain enamel industry, company says.

The ceramic circulating system supplies identical material to three spray stations, insuring uniform finishes on all Hotpoint range components.



Uniform finish is made on all parts with new system.

After the frit has been milled, it is stored in large stainless steel tanks on a balcony above the mill. From there, it flows by gravity through magnetic separators to a pump which lifts it to two large stainless steel mixing tanks on the balcony. Specially-designed stainless steel air-driven agitators prevent frit from settling-out in tanks.

From mixing tanks frit is pumped past all spray stations through a closed system of stainless steel pipes. Frit which is not sprayed returns to the tanks in the mill room for recirculation. Two diaphragm-type pumps that circulate the frit are designed to withstand frit's abrasive action.

Heart of the system is the new regulator at each spray station.

Cleaning:

Zinc castings pre-cleaned with three new chemicals

Field tested for more than 12 months, a new process for precleaning of buffed zinc die castings and other metals, preparatory to plating, has recently been announced.

Three products by Wyandotte Chemicals Corp. were research-developed for this new process which has already precleaned many millions of parts with acclaimed results. The new operation is said to give the metal finishing industry an integrated, complete and effective chemical cleaning process for metal buffed parts.

Field testing by automotive, job plating and plumbing ware shops has shown that the new process practically eliminates fire hazards. Flash point of the key product is above 210°F. It does away with hand swabbing, obnoxious odors and yet gives improved cleaning, company says. In a plant doing a heavy volume of die cast plating, rejects were practically eliminated and cleaning costs were reported reduced as well.

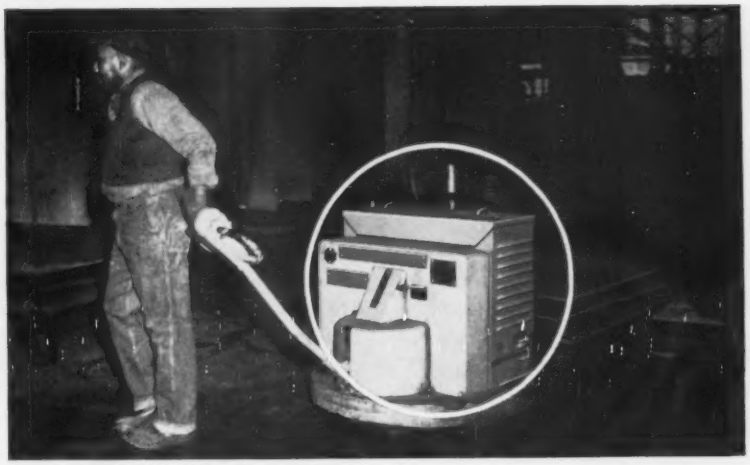
Finishing:

New fluorescent lighting plant uses new methods

Both electrostatic and hand spray painting processes apply finish on Smithcraft fluorescent lighting fixtures.

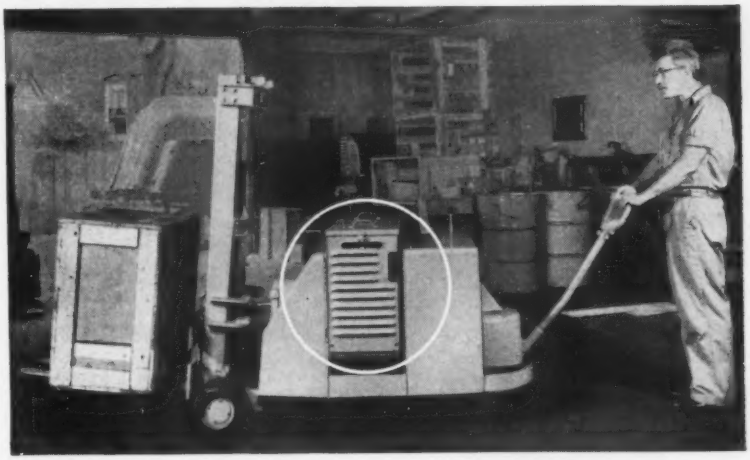
Smithcraft's new plant at Chelsea, Mass. claims use of the latest techniques in cleaning, bonderizing, painting, baking and materials handling, integrated into one continuous "Semi-automatic" procedure.

The finish on these products must be well bonded, strong and uniform in thickness. It must retain its reflective and protective qualities for many years. The finish must be applied rapidly yet carefully over the surface shapes of rather diverse complexity.



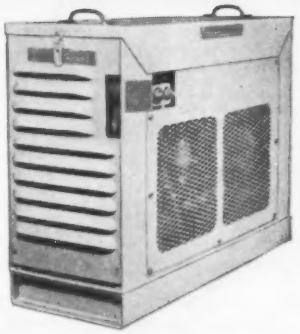
The Most Versatile Power Unit Ever Developed For Small Trucks

READY-POWER BANTAM MODEL W



Only the compact new Bantam Model W provides smooth, dependable gas-electric power that can be quickly interchanged from truck to truck.

A new high-performance unit features 12-volt automotive-type starting and ignition system plus complete choice of idling speed. Full access to engine and generator simplifies adjustment, even on the truck. Fits practically all makes of walkie and rider trucks up to 2000 lbs. *Write today for full information.*



READY-POWER

The READY-POWER Co., 3822 GRAND RIVER AVE., DETROIT 8, MICH.

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

Smithcraft recently installed a completely new finishing operation in its new plant. Modern automatic operations have been combined into a system that meets necessary standards.

Finishing Conveyor

An overhead chain conveyor feeds the finishing and assembly processes. Finishing conveyor system consists of two lines. One, Smithcraft calls the "main line"; the other, the "electrostatic line." Actually, the "electrostatic line" is a sort of spur track leading the work through a Ransberg #2 Process and back to the "main line" just ahead of the Assembly operations.

Conveyors carry C-type hooks on two-feet centers. The "main line" conveyor is approximately 1400 ft long and travels at 15 ft per minute. The "electrostatic line" or spur is approximately 700 ft long and travels at eight ft per minute. Work traveling along the "main line" on the way to the electrostatic section is hung on intermediate hooks which are transferred at the end of the Bonderizing Process and proceed through the Ransberg #2 Process to the main mill where they are "unhung" for assembly.

Dramatic Contrast

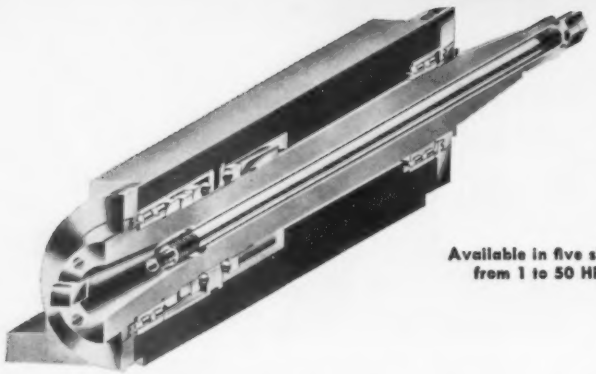
The present process is a dramatic contrast to the former method. "Bonderizing," the process of Parker Rustproof Co., is now used at Smithcraft for guarding the metal fixtures against corrosion and preparing their surfaces with a good paint base. This installation by R. C. Mahon Co. performs cleaning and phosphatizing operations automatically. The work is carried by the conveyor line through a series of tunnels where the following is performed: (1) cleaning, (2) hot water rinse, (3) phosphatizing in a solution of "Bonderite 1000," (4) cold water rinse for 30 seconds, and (5) rinse.

Travelling products are finished by reciprocating disc.

This is followed by a dry-off cycle of five minutes in a direct-fire oven at 350°F and a 4¼ minute full cycle of the conveyor for work cooling. It is at this point that the work either continues along the main line for hand spraying or is transferred. for electrostatic coating.

Your BEST PACKAGED BUY in milling spindles

POPE HEAVY DUTY PRECISION SPINDLES



Available in five sizes from 1 to 50 HP

POPE HEAVY DUTY MOTORIZED MILLING MACHINE SPINDLES are available in P-2500 Series, from 1 to 100 HP, totally-enclosed, fan cooled; also in high cycle, water cooled units.

P-12000 Series *Belt Driven* in sizes from 1 to 50 HP, with Standard milling machine tapers in the nose from #10 to #60. *Operable in any position you specify.*

See: the big shaft, the heavy duty double row cylindrical roller bearings and thrust bearings that have extra ability and the rigidity to support your cutting tools.

For complete dimensions, write for Bulletin S-8.

You can specify POPE PRECISION SPINDLES with Confidence No. 110

Specify **POPE** PRECISION SPINDLES

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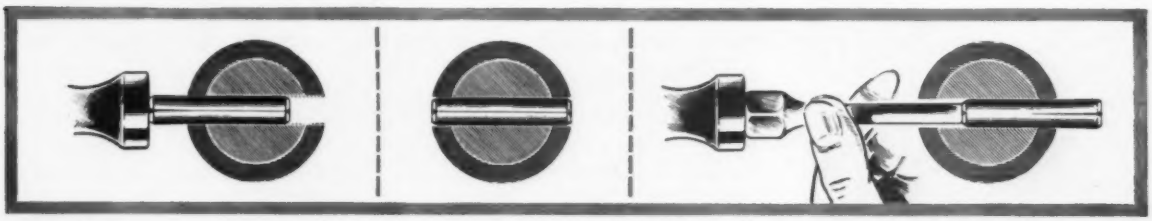
what makes this fastener DIFFERENT?

Several things. Rollpin® is a slotted, chamfered, cylindrical spring pin which drives easily into a hole drilled to normal production standards. It locks securely in place, yet can be drifted out and reused whenever necessary. This eliminates special machining, tapping, and the need for hole reaming or precision tolerances. Rollpin replaces taper pins, straight pins and set screws; for many applications it will serve as a rivet, dowel, hinge pin, cotter pin or stop pin.

And here's another difference that makes Rollpin the quality fastener in the field: ESNA's quality control builds consistent strength and performance into every Rollpin. Rollpin is uniform as to shear strength, dimensions, hardness, and insertion and removal forces.

HOW YOU INSERT IT



Drives easily by hammer, arbor press, or air cylinder and can be readily adapted to an automatic hopper feed. Requires only a standard hole, drilled to normal production-line tolerances.

Locks securely in place without using a secondary locking device; won't loosen despite impact loading, stress reversals, or severe vibration.

Removes readily with a drift pin without damage to pin or hole, can be used again and again in original hole.

HOW YOU SAVE

You pay less for Rollpins than for most tapered, notched, grooved or dowel pins. Installation costs are substantially less than for any fastener requiring a precision fit or secondary locking operations.

Because of their tubular shape, Rollpins are lighter than solid pins. Production maintenance is reduced with Rollpins: they do not loosen and because of their spring action they tend to conform to the drilled hole in which they're inserted, without material hole wear, eliminating the necessity of re-drilling or using oversize pins.

MATERIALS AND SIZES

Standard Rollpins are made from carbon steel and Type 420 corrosion resistant steel. They're also available in beryllium copper for applications requiring exceptional resistance to corrosive attack, good electrical, anti-magnetic, and non-sparking properties. Stock sizes range from .062" to .500" in carbon and stainless steels.

ROLLPIN®

ESNA

ELASTIC STOP NUT CORPORATION OF AMERICA

Dept. R40-677, 2330 Vauxhall Road, Union, New Jersey

Please send me the following free fastening information:

- ☐ Rollpin Bulletin
- ☐ Elastic Stop nut Bulletin
- ☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name _____ Title _____

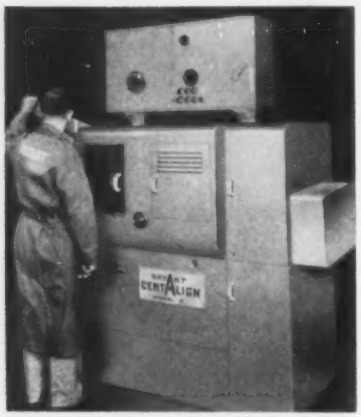
Firm _____

Street _____

City _____ Zone ____ State _____

NEW EQUIPMENT

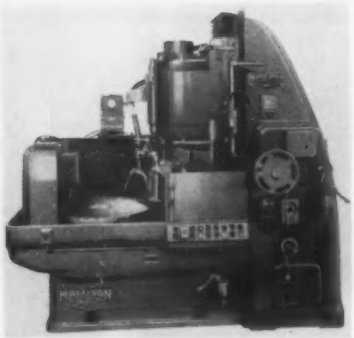
New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 117 or 118.



Internal grinding machine has 10 in. swing

Greater rigidity and stability are emphasized in a new internal grinding machine. This automatic grinder is said to be capable of faster stock removal and greater accuracy than any other present-day integral grinder. Features of the grinder include: workhead, wheelhead and longitudinal and cross slide motions of the wheel-slide in one common plane, and vibration absorbers incorporated in the fabricated bed. The machine has a 10 in. swing and one in. grinding stroke. It is designed for long run, high production grinding of bearing raceways and taper bores, and for similar operations on various work parts. It is said to embody latest developments in shoe centerless grinding. It is adaptable to automated lines. However, machine control by programming cam sets makes certain types of recurring short-run operations feasible. Machine's approximate net weight is 5280 lb. *Bryant Chucking Grinder Co.*

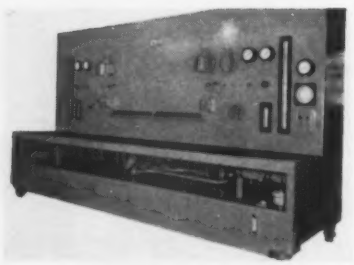
For more data circle No. 25 on postcard, p. 117



Surface grinder redesigned for automatic cycling

To increase stock removal rates and accommodate new work types requiring close tolerances, one company has redesigned its vertical rotary surface grinders. Automatic cycling through use of one of two automatic systems may be installed on them. Both provide push-button actuated automatic cycling including: (1) Coolant pump switching on, (2) positioning grinding table, (3) magnetizing and rotating table, (4) feeding to size, (5) sparking out, and (6) returning to loading positioning. An air-gauging system continuously measures work and gives operator visual indication parts are approaching size. Micro-switch automatic sizing system is an electro-mechanical device. It actuates cycle grind completion for next load. *Mattison Mach. Works.*

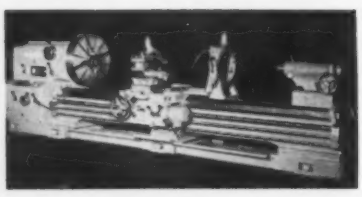
For more data circle No. 26 on postcard, p. 117



Checking stand gives pressures up to 10,000 lb psi

Hydraulic cylinders are tested on this stand at pressures up to 10,000 lb psi. Hydraulic pumps supply fast traverse volume to several test cylinders and large boosters to raise pressures to that amount at end of stroke. Several cylinders can be cycled continuously with timer. Monometers provide packing leakage check. Manual valves control air pressure. Quick disconnect couplers and hoses are supplied for connecting cylinders to stand. Valves control cylinder movements. *J. N. Fauver Co., Inc.*

For more data circle No. 27 on postcard, p. 117



New lathe line for use with ceramic, carbide tools

Designed for use with Standard, tungsten carbide and ceramic tools, a full line of new standard engine lathes come in four models and 11 sizes from 18 in. swing, 10 hp to 55 in. swing, 52 hp. All have 24 speeds in geometrical progression. Standard speeds range from 12 to 1200 rpm and high range speeds go from 15 to 1500 rpm. *Maserati Corp. of America.*

For more data circle No. 28 on postcard, p. 117

CHASE® NICKEL LEADED COMMERCIAL BRONZE

Tensile Strength up 27%
Yield Strength up 20%
above leaded commercial bronze!

Rugged is the word for Chase Nickel Leaded Commercial Bronze. It has *all* the corrosion resistance of Leaded Commercial Bronze, *plus* increased tensile and yield strength. At the same time, Chase Nickel Leaded Commercial Bronze has a high relative machinability of 80%, which is excellent for screw machine work.

This is the bronze alloy—moderately priced—for your products that take a beating! Products like electrical fasteners, pole line hardware, nuts and bolts.

Chase Nickel Leaded Commercial Bronze is available in round and hexagonal rod form. Round sizes from ¼" to 1" diameter. Hex sizes from ¼" to ⅜" diameter. For further information, write Chase Engineering Service, Dept. A.

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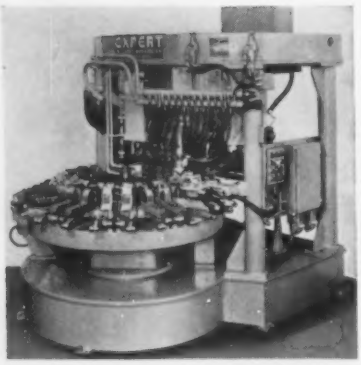
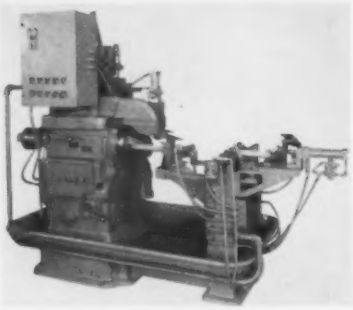


Index welder has continuous running cam drive

This 12-station index welder features a continuous running cam drive that controls index and weld sequences. Use of this type drive simplifies sequence timing functions; the welds being made when the five rpm cam is in dwell position. It welds 1200 two-piece, right and left-hand automotive hood hinge stamplings together per hr with nine spot welds. Both right and left-hand parts are welded on the machine in adjacent fixtures on the six ft diam index table. Parts are clamped in 24 fixtures by stationary air-operated clamps at welding stations. Both transformers and hydraulicly powered welding guns for four weld stations are suspended from an upper platform supported by four tubular steel columns. Air-operated ejector mechanisms are provided at separate stations. *Expert Welding Mach. Co.*

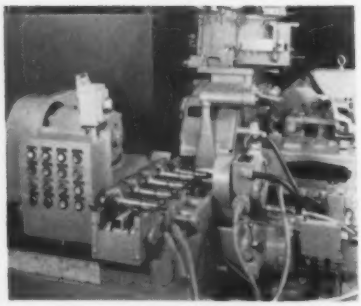
For more data circle No. 29 on postcard, p. 117



Automated lathe handles red-hot welded parts

Specialized production jobs can be handled by a new automated standard lathe. It is comprised of a pedestal base, a combined headstock and feed works unit, a headstock turner slide and a packaged automatic loader and ejector mechanism. Welded parts are delivered to the lathe red hot directly from the welding machine by a conveyor. Upon completion of a finished turned part, spindle stops, the hinged steady rest roll carrier is retracted, the collet chuck opens and the finished piece is ejected from the collet by a spring loaded ejector rod. Part is deposited on unloader arms to discharge chute. *Seneca Falls Mach. Co.*

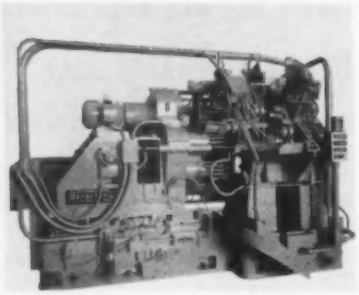
For more data circle No. 30 on postcard, p. 117



Automatic machine grinds stem pinions

Stem pinions can be ground automatically with this new machine. It features special workholding and driving equipment with self-loading and unloading devices. Automatic controls are incorporated into machine permitting one operator to supervise more than a single machine. Many features of past machines have been included in this one. Pinions are placed in loading chute which automatically moves the pinion down inclined ways to a revolving turret. This places it in position for the footstock center to engage center hole and push it forward into floating type headstock collet. Grinding wheel truing is automatic at predetermined intervals by device mounted on wheel head. *Norton Co.*

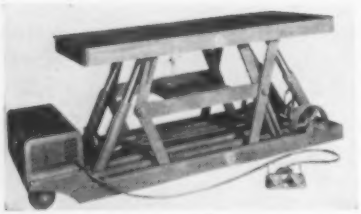
For more data circle No. 31 on postcard, p. 117



Drum type machine drills, taps, chamfers and reams

Completely automated drilling, chamfering, reaming and tapping operations are handled with a new eight-station drum type machine. In use presently for machining rear axle drive gear in an automotive plant, conveyor delivers gears to loading pocket. Loading arm picks up gears. Holding fixture clamps them. At separate stations, drilling is done, chip blowout cleans holes and probing unit gauges them, chamfering is done, holes are reamed, holes are tapped, and piece is unclamped for discharge to removal conveyor—all automatically. Production exceeds 200 per hr, according to the manufacturer. *Barnes Drill Co.*

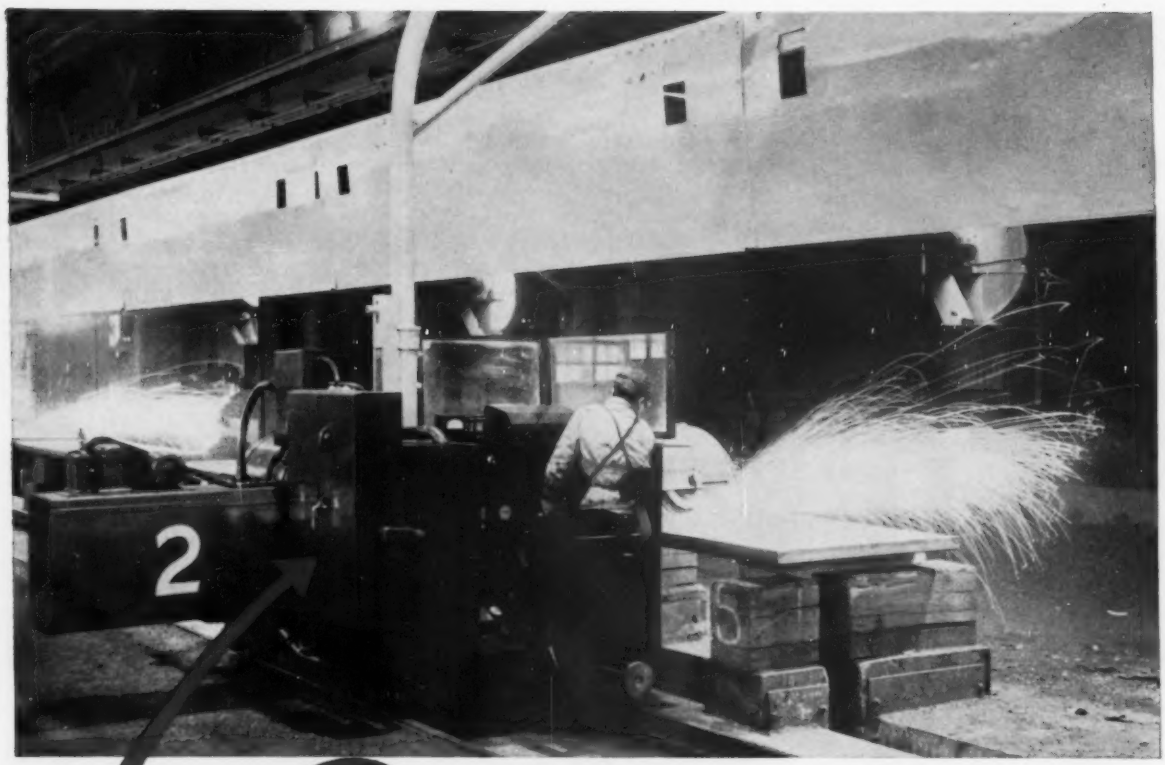
For more data circle No. 32 on postcard, p. 117



Press feed lift table has a 10,000 lb capacity

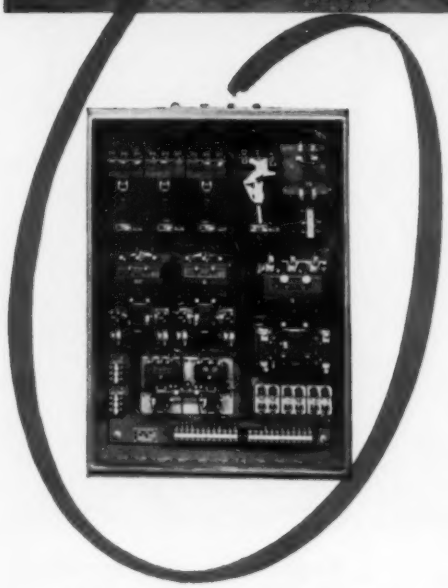
With a 10,000 lb capacity, this press feed lift table meets the majority of requirements for handling steel sheets at shears and presses, maker says. It has an electric hydraulic power unit and foot operated push button controls. The one hp continuous power unit operates on 220-440/3/60 current. Lift speed is 1½ fpm. Table is 78 in. long, 36 in. wide. Overall length is 93 in. Deck height is from 18 to 36 in. *Colson Corp.*

For more data circle No. 33 on postcard, p. 117



CLARK Type "CY" CONTROLS

help Mid-West Slab Grinders triple output at Crucible Steel!



Clark Type "CY" Control Panel mounted on each machine contains a size 0 reversing, two size 2 and one size 3 Type "CY" motor starters.

Ten track mounted billet grinders built by the Allied Machine and Engineering Co., a subsidiary of Mid-West Abrasive Company, are setting new performance standards at Crucible Steel's Midland, Pa. mill. Replacing manually operated and unwieldy swing grinders, these machines do the job better, faster and safer with electrically-controlled hydraulic positioning.

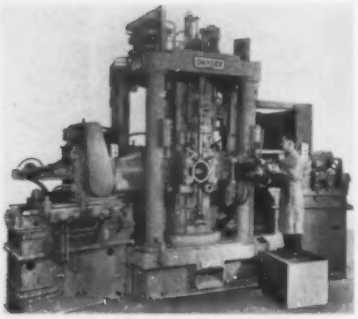
Accurate and complete control of stroke, wheel position, rotation and pressure results in smaller metal loss, less wear on grinding wheels and better finish. Clark Controls provide the accuracy and dependability these machines require, and prove again that Clark Type "CY" starters have the extra stamina required for heavy-duty mill-type service.

The **CLARK** **CONTROLLER** *Company*

Engineered Electrical Control

1146 East 152nd Street • • Cleveland 10, Ohio

IN CANADA: CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO

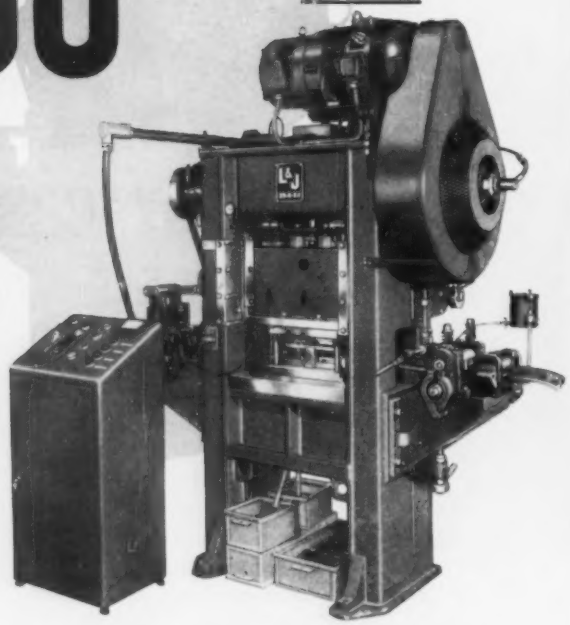


Vertical trunnion index machine saves space

Floor space requirements are cut down with a new vertical trunnion index machine for machining long parts. It is described as having space-saving advantages of a center-column type machine tool, but has no index table as such. Instead, center-column itself holds work fixtures and rotates parts from station-to-station. Upper and lower tapered roller bearings support trunnion. Four tubular steel columns support upper outboard bearing frame. Hydraulically operated, electrically controlled machine rough and finish faces the housing flange, drills and reams ten holes in flange mounting face and chamfers holes, both sides. It produces 105 housings per hr. *Snyder Tool & Eng. Co.*

For more data circle No. 34 on postcard, p. 117

450 S.P.M. to keep production costs down



L&J

DOUBLE CRANK STRAIGHT SIDE PRESS

Here's new life for lagging production — speeds up to 450 strokes per minute to give you new highs in the output of small precision parts. Designed primarily for use with progressive dies this versatile press gives you everything you need — speed — accuracy — big capacity — long die life — ease of set-up. It pays off in lower production costs. Write for complete information.

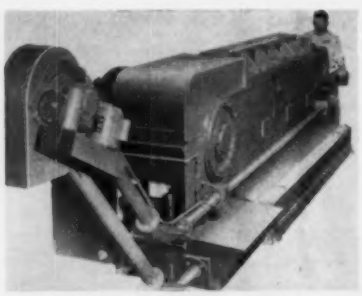
L & J Press Corporation • 1623 Sterling Ave. • Elkhart, Indiana

SPECIFICATIONS

Model	20-2-24	30-2-24	40-2-36	50-2-36
Capacity	20 tons	30 tons	40 tons	50 tons
Speed, strokes per min.	150-450	150-450	150-300	150-300
Die space, standard	11"	11"	12"	12"
Ram area	24" x 12"	24" x 12"	36" x 20"	36" x 20"
Bolster plate	24" x 19"	24" x 19"	36" x 24"	36" x 24"
Stroke lengths, standard	1"—2"	1"—2"	1"—3"	1"—3"
Ram adjustment (ratchet)	2"	2"	2"	2"

Broaching machine

Longer broach life and extremely fine finishes are claimed of a new heavy-duty horizontal continuous broaching machine. Fixture locking, operation and unloading are automatic; loading can also be so. Frame is of all-welded, heavy steel plate construction. An oversize bull gear is said to provide pulling



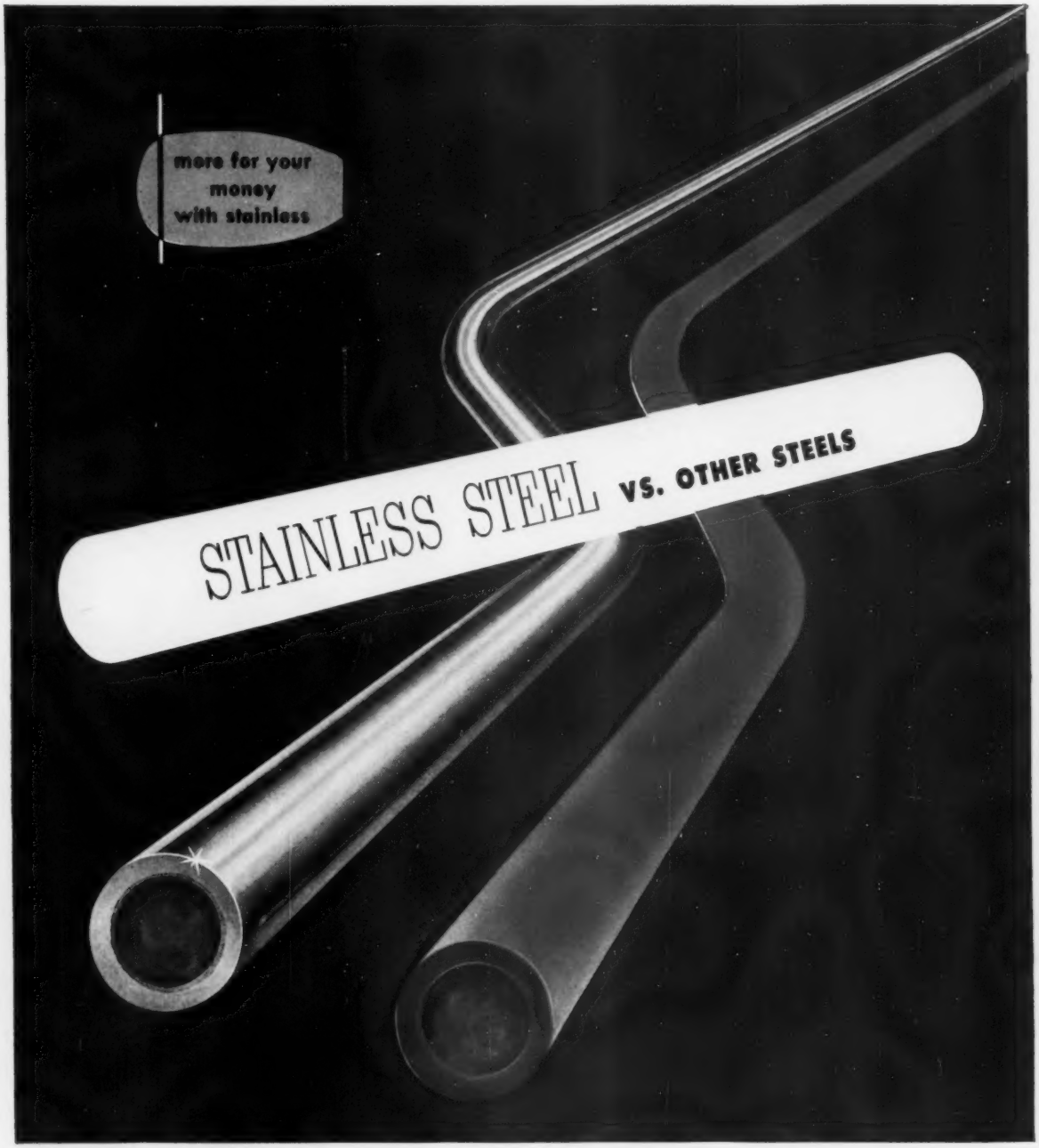
power, extra weight and smooth operation. Loading and unloading a variety of sizes and shapes is possible due to extra fixture clearance formed by large radius from chain axis to outer machine frame. Cutting speeds up to 40 rpm can be obtained. *Detroit Broach Co.*

For more data circle No. 35 on postcard, p. 117

Pedestal honing machine

Improved in design, a new combination pedestal model JCP honing machine and coolant unit has just been announced. Features include enclosure of coolant unit in base, increased capacity to 10 gal, a larger, expandable coolant tray working surface, and a V-belt drive. It has a honing range from .120 to 2.500, without adapters. Spindle speeds are variable. *Superior Hone Corporation.*

For more data circle No. 36 on postcard, p. 117



Regardless of present conditions it is often difficult to predict future operating requirements. A generous safety factor should be allowed for all possible conditions of corrosion, oxidation, pressures and temperatures. In the range of B&W stainless steels will be found the answers to virtually all of these conditions. It's easy to anticipate substantial savings in downtime and labor costs in replacing worn-out tubing made from less hardy metals. Be sure with B&W stainless.

Get in touch with Mr. Tubes, your link to B&W, for the story of how you can get more for your money with stainless tubing. *Or write for Bulletin TB 1.*

B&W
TUBULAR PRODUCTS DIVISION

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa. and Milwaukee, Wis.: Seamless Tubing, Welded Stainless Steel Tubing
Alliance, Ohio: Welded Carbon Steel Tubing
Milwaukee, Wis.: Seamless Welding Fittings

TA-5035(P)

Junior sized ovens

A new line of four junior sized Utility Ovens for small batch drying, curing, baking, processing, heat treating, product control and sample testing have approximately 2 x 2 x 2 ft oven interior dimensions, but vary in temperature ranges from 100°C to 1,000°C. A true forced air recirculating system is maintained within the oven chamber through a fan and controlled intake and exhaust vents. A shielded heating element prevents radiant over-heating and aids

in a more even temperature control throughout the chamber. Oven interior is lined with aluminized sheet steel allowing quick, easy cleaning of the entire chamber. A drip pan collects and disperses accumulated moisture and aids in keeping a non-contaminating interior. Exteriors are of baked hammerstone gray finish. *New England Oven and Furnace Co.*

For more data circle No. 37 on postcard, p. 117

Air driven hot salt pump

Air driven hot salt pump is designed especially for pumping molten salts and hot metals. Pump is powered by an air-driven motor which by its very nature is self-cooling. Body is made of a limited number of sturdy parts designed for operation under high ambient temperatures. Available in steel or with stainless steel submerged parts. *Ajax Electric Co.*

For more data circle No. 38 on postcard, p. 117

Q. Which steel shot provides
FASTEST CLEANING
+ LOWEST SHOT CONSUMPTION
+ LOWEST EQUIPMENT MAINTENANCE
= Lowest Cost Cleaning

A. WHEELABRATOR®
STEEL SHOT

Wheelabrator Steel Shot is the only shot that gives you all the qualities vital to lowest COST cleaning and peening. Its high hardness gives super cleaning speed. Its toughness gives extra long life for minimum shot consumption and low maintenance costs. Wheelabrator Steel Shot has so proved itself that it now outsells all other steel abrasives combined. It outsells because it outperforms. Try it today. It's the low-cost answer to your cleaning problems. Write today for your copy of Catalog 89-C.

Now available in new S.A.E. size S-280 shot

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DEPENDABLE
QUALITY • PRICE • SERVICE
Electro-manganese 99.9+%
STANDARD OF THE WORLD FOR PURITY
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A Stable Nitrided ELECTROMANGANESE
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Most Complete Stock in America of
BLUE TEMPERED SPRING STEEL
We believe that the way to sell is to carry a stock which permits satisfying any reasonable warehouse demand.

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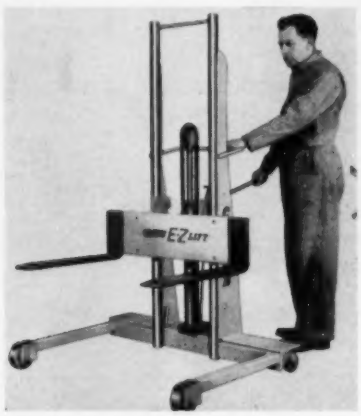
All-angle vise is set up quickly

This all-angle vise provides quick, easy set-up for any machining operation requiring simple or compound angle. Difficult compound angle milling, drilling, grinding, reaming and checking operations may be performed with little set-up time. Work is held rigidly and vise can be securely locked in any position. It has three separate adjustments for angle set-up. Swivel base is graduated 360° for all horizontal positions. Vise may be set at angle from 0° to 90° on its side, and locked in position. Vertical angles from 0° to 90° may be obtained by setting the top hinged base in position and locking the support arm screws. Both the vertical and compound angle bases are graduated 0° to 90°. *Chicago Tool and Eng. Co.*

For more data circle No. 39 on postcard, p. 117

Hydraulic lifts

A new line of manually operated hydraulic lifts, has been introduced. There are three models in the line: a 1000 lb capacity table lift, a 500 lb capacity table lift, and a 1000 lb capacity fork lift with optional interlocking safety plate platform for quick conversion to a lift table. All models are suited to a variety of lifting jobs where limited space or operating conditions make larger lifts impractical. They offer ease of operation,



exceptional maneuverability and built-in protection against overloads. Easily operated and maneuvered by one man, their smooth hydraulic lifting action elevates loads to any height up to 54 in. above the floor. For operator's protection and the material being handled, lifts are equipped with safety overload releases. Roller bearing equipped rubber front wheels and roller bearing equipped swivel-type rear casters assure easy moving. *Crown Controls Co., Inc.*

For more data circle No. 40 on postcard, p. 117

ERIE Bolts • Studs • Cap Screws • Nuts
In Alloys • Stainless • Carbon • Bronze

Designers and engineers from every field of industry submit their exacting specifications to us for special fasteners to resist corrosion, extremes of temperature, tensile, fatigue, impact, and shear stresses. For more than 40 years our skilled craftsmen have met the requirements of construction and farm machinery, of transportation, refining and railroad equipment, the heavy machines of industry, pressure vessels, compressors, pumps, in widely diverse applications. We are prepared to serve you well. Send us your fastener specifications for prompt estimate.

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ERIE BOLT & NUT CO.
Erie, Pennsylvania
Representatives in Principal Cities

Look Overhead . . . see "NORTHERN"

For heavy, continuous service in steel storage yards

The 40-ton, 75-foot span, heavy duty crane shown above is typical of many similar NORTHERN CRANE installations in steel mills, fabricating plants, and similar plants in heavy industry.

NORTHERN mill type cranes are designed and built to meet the most exacting requirements, providing for continuous service, maximum loads, and high impact allowances. Mill type motors and control equipment provide highest electrical performance.

NORTHERN CRANES are the result of over 55 years' experience in the design of overhead electric traveling cranes, heavy duty electric hoists and other materials handling equipment.

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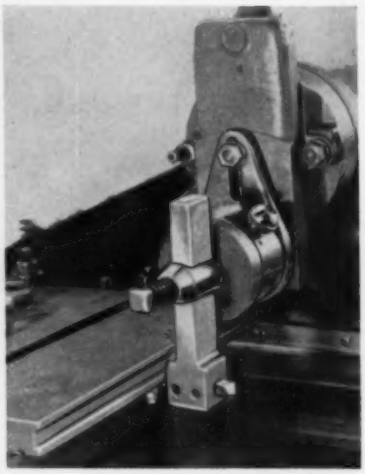
NORTHERN | MATERIALS HANDLING EQUIPMENT

NORTHERN ENGINEERING WORKS
210 CHENE ST., DETROIT 7, MICH.

New tool head

Machine shop shapers may assume a bigger role in shop production says the makers of a new tool head. It is said to promise replacement of regular clapper box on shaper and other metalworking machines. Basic advantage is that a shaper operator can forget about allowing for tool relief on the backstroke

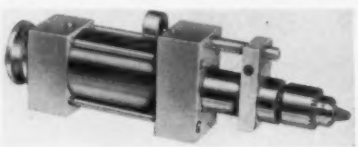


when setting up. Where backstroke tool relief provided by a clapper box is dependent upon gravity and limited to tool setting for work in a downward arc, the new "tool" provides automatic mechanical relief with the tool set in any position right or left, upside down, at an unlimited number of points in fact, over a 360° range. *Zierden Mfg. Co.*

For more data circle No. 41 on postcard, p. 117

Pneumatic machine tool

This pneumatic machine tool is designed for production use in drilling, reaming, tapping, countersinking and other machine operations requiring rotary and feed motions.

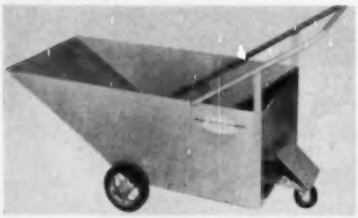


It operates at 9000 rpm and comes in 1½, 3 and 6 in. strokes. It is rated at ½ in. capacity in steel. *Alkon Products Corp.*

For more data circle No. 42 on postcard, p. 117

Materials handling cart

Suited for transporting small parts, chips, shavings, clippings, liquids and waste, this low-cost materials handling cart, has been introduced. With overall height of 20 in. it has easy clearance under work benches, hoppers, feeders, or machine tools.

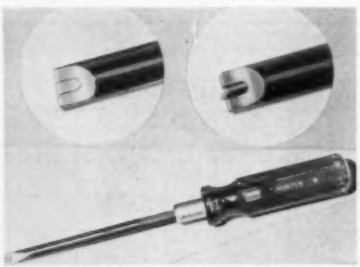


Bin type design makes for easy loading and dumping. It has a short turning radius useful in narrow aisles and its low center of gravity increases maneuverability. Handle design makes stooping unnecessary but does not decrease the cart's effectiveness in areas of limited clearance, maker says. *Coolant Equipment Corp.*

For more data circle No. 43 on postcard, p. 117

Non-slipping screwdriver

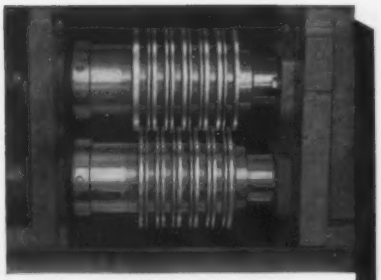
With a hollow blade, a new non-slipping screwdriver has been unveiled. Fashioned from metal tubing, the blade contains a second tip which turns in a cutout portion of the primary blade to grip the screw slot. As the operator pushes the screwdriver handle, second blade turns at right angles to primary blade's width. The harder



the push, the tighter the grip. The tip turning mechanism is housed in the primary blade. To maintain the blade strength and provide space for this mechanism, cold drawn steel tubing was used. It is said not onlv to give a tight grip in work slots but also allows holding screws without being magnetized. *Superior Tube Co.*

For more data circle No. 44 on postcard, p. 117

COWLES
SLITTING KNIVES



Cut costs 3 ways

Cowles knives reduce ser-up time. They are made so accurately they can be assembled on the arbor without shimming. Cowles knives stay on the job longer;— they reduce down-time for re-grinding; and produce straight edged strip with minimum burr avoiding tie-ups in blanking operations.

For maximum economy and satisfaction order your knives and spacers from Cowles, world's largest manufacturer of rotary slitting knives. Prompt delivery. Complete range of sizes and analyses for slitting high and low carbon steels, stainless, alloys, silicon or non-ferrous metals.

Engineering Assistance On Any Slitting Job!

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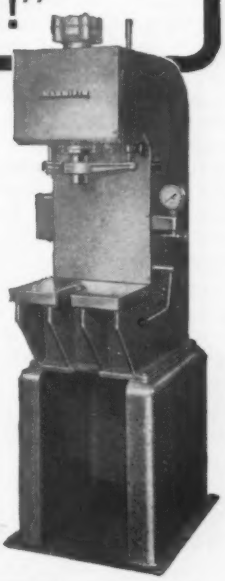
Specializing in the Manufacture of

ROTARY SLITTING KNIVES • SPACING COLLARS • GANG TOOLS • EDGING ROLLS • CUT-OFF KNIVES • SEAM GUIDE ROLL FINS • SEAM GUIDES • WIRE DRAWING TOOLS • STANDARD AND SPECIALLY ENGINEERED TOOLS FOR ALL FERROUS AND NON-FERROUS PROCESSING, TRIMMING AND FORMING REQUIREMENTS.

"BEST $1306 WE EVER SPENT!"



That's the price of this 5-Ton HANNIFIN Press*

A lot of production men have made such comments about this versatile little hydraulic press.

They like the way you can adjust it to the exact force you need for each job, all the way from 1 ton to 5 tons. The backstroke is adjustable, too, so the ram just clears the work on any job. Fast-acting controls. Prompt delivery from stock.

WRITE. Complete information and prices on the Hannifin line of 1- to 10-ton Hydraulic Presses will be sent on request.

*Price complete with motor and starter F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.

HANNIFIN

Hannifin Corporation, 513 S. Wolf Rd., Des Plaines, Ill.

CONTROLLED PRESSURE AT 100,000 PSI!

Superior super pressure quality tubing has been used to handle internal pressures from 15,000 to 100,000 psi—offers high fatigue strength, chemical resistance and burst pressure to spare

In *any* industry, handling liquids and gases safely and efficiently under extremely high pressures can be done best by using only top-quality tubing. And Superior *specializes* in premium quality super-pressure tubing.

Superior produces this tubing from specially selected raw materials which have had the inside surfaces conditioned to remove fissures and other defects. In processing, special degreasing operations are performed on the tubing, and the inside diameters are sand blasted to insure a clear, smooth surface.

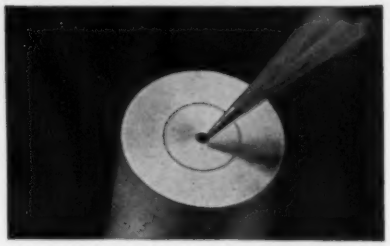
Two types of Superior super pressure tubing are available: a single wall mechanical tubing and a double wall, or composite unit, made from two thinner tubes.

Super pressure tubing is produced in an annealed condition and in ⅛ hard temper, and to mechanical properties specified by the customer.

This tubing is offered in the austenitic stainless steels, Types 304, 316, 321 and 347 and in AISI 4130 alloy steel. It is produced in sizes ⅛" OD x 1/16" ID up to ¾" OD x 1/16" ID. Minimum order quantity for mill production is 50 ft. per size and analysis.

Superior rigidly inspects all super pressure tubing for defects such as fissures by visual and microscopic inspection methods. Each length is hydrostatically tested to 5000 psi—upon request, up to 60,000 psi.

If you have a tubing problem in high pressure processing—or of any other nature—call on Superior. Write Superior Tube Company, 2004 Germantown Ave., Norristown, Pa., for Data Memorandum 22.



The composite type stainless super pressure tubing offers the advantage of having the inner and outer tubes independently worked to mechanical property requirements and of different alloys being combined for strength and corrosion resistance.

SUPER PRESSURE TUBING MINIMUM BURSTING PRESSURES FOR AUSTENITIC STAINLESS STEELS AND 4130 ALLOY STEELS

	MAXIMUM WALL			
OD	.053	.095	.156	.218
⅛	*97,200 84,400			
¼	*40,200 34,800	82,000 71,000		
½	*17,400 15,000	33,500 29,100	62,500 54,000	
⅝	*13,600 11,800	25,000 21,600	47,600 40,300	72,600 63,000

*Top figures all Austenitic Stainless Steels
Bottom figures all 4130 Alloy Steels

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010" to ⅜" OD—certain analyses in light walls up to 2½" OD

West Coast: Pacific Tube Company, 5710 Smithway St., Los Angeles 22, Calif. • RAymond 3-1331

The Iron Age SUMMARY . . .

Lack of plate and structurals hurting construction . . . Auto sales beginning to show signs of life . . . Labor talks enter critical phase . . . Scrap prices still soft.

Construction Hurt . . . Talk of a letdown in steel demand has a hollow sound to the construction industry. Builders have all they can do to get enough steel to keep projects rolling.

With plate and structural mills operating at capacity, some construction projects are falling behind. As the construction tempo quickens, the situation is likely to get worse. The Federal highway program will heighten the confusion.

The situation in the construction field points up one side of the steel picture largely overlooked in the concentration on easier demand from automotive and other consumer industries. Even in consumer goods, there are signs of better things to come.

Other strong points in the steel market include freight car building, capital equipment, and oil and gas. These industries are taking everything they can lay hands on—and would take more if the steel were available.

Auto Pickup . . . Automotive sales are beginning to perk up over the nation as the lure of summer highways and the promotion of car dealers loosen the purse strings of prospective consumers. And increased sales, plus cutbacks in auto production, are steadily decreasing top-heavy inventories of new cars. It's a sure bet that new car inventories will be down to where the auto companies want them by the time new models get into production.

Meanwhile, steel labor talks are entering a critical phase this week. Union reaction to company counter-proposals will be the first concrete indication of odds on a costly walkout.

A peaceful settlement of labor negotiations does not necessarily mean a significant letdown in steel demand during the third quarter. Consumers are not as pessimistic over their own sales prospects as some earlier appraisals had indicated. The letdown will be due largely to vacations, summer heat, and urgently-needed repairs to melting and processing equipment.

Production Prediction . . . THE IRON AGE estimates that steel output this year will exceed last year's 117 million tons; possibly by as much as 1 to 3 million tons, barring a strike. The fourth quarter pickup will more than make up for a third quarter easing.

Scrap prices continued soft as mills minimized purchases pending outcome of labor talks. But the market will strengthen when this uncertainty is cleared up.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,388	2,388	2,375	2,327
Ingot Index				
(1947-1949=100)	148.7	148.7	147.8	144.8
Operating Rates				
Chicago	100.0	98.5	100.0	98.0
Pittsburgh	98.0	100.0*	99.0	100.0
Philadelphia	103.0	106.0	101.0	95.0
Valley	98.0	99.0*	98.0	95.0
West	100.0	103.0*	97.5	98.0
Detroit	99.0	98.0*	100.0	94.0
Buffalo	105.0	105.0	105.0	105.0
Cleveland	103.0	102.5*	101.0	103.0
Birmingham	23.5	23.5	23.5	94.0
S. Ohio River	92.0	95.0*	94.0	84.0
Wheeling	103.0	106.0*	102.0	101.0
St. Louis	102.0	95.0	94.0	102.0
Northeast	84.0	84.0*	87.0	90.0
Aggregate	97.0	97.0	96.5	96.5

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.179	5.179	5.179	4.797
Pig Iron (Gross Ton)	$60.29	$60.29	$60.29	$56.59
Scrap, No. 1 hvy (gross ton)	$44.83	$45.83	$53.17	$34.67
Nonferrous				
Aluminum ingot	25.90	25.90	25.90	23.20
Copper, electrolytic	46.00	46.00	46.00	36.00
Lead, St. Louis	15.80	15.80	15.80	14.80
Magnesium	34.50	34.50	34.50	29.25
Nickel, electrolytic	64.50	64.50	64.50	67.67
Tin, Straits, N. Y.	94.00	93.625	98.875	91.125
Zinc, E. St. Louis	13.50	13.50	13.50	12.00

Summer Market Outlook Firm

Survey indicates that most steel users plan to keep orders intact with or without steel walkout . . . Market for cold-rolled still soft . . . Plate, structurals tight.

◆ REGARDLESS of the outcome of steel labor negotiations—whether there is a strike or a peaceful settlement — most steel users apparently have no intention of canceling orders.

A survey by Research Institute of America indicates: (1) bulk of steel consumers intend to keep orders alive regardless of the way steel negotiations go, and (2) five of six users are optimistic over their own sales outlook, with almost half expecting better business in the closing months of the year.

The survey showed that about 4 of 10 steel customers have built inventories beyond a "normal" level to protect themselves against a strike and a price rise. Of these, 17 pct said they had stockpiled more than 21 pct over normal inventory; another 11 pct had stockpiled between 11 and 20 pct, and 10 pct had accumulated stocks less than 10 pct above normal.

Of the companies reporting extra orders, roughly a quarter said they intended some cancellations, but most of the proposed cancellations were for less than 20 pct of the original orders.

The current steel market is marred by some weak spots, chiefly in cold rolled sheets. On the other hand, hot rolled sheets, plates, and structurals, manufacturers and construction wire, and seamless tubing are strong. And some steel men say their companies will sell as much steel as they can make during the summer.

SHEET AND STRIP . . . In **Pittsburgh**, a portion of the slack left from automotive cutbacks is being taken up by other markets for cold rolled products. But the drop in auto orders for cold-rolled is bringing a juggling of orders in favor of hot-rolled. One producer reports no easing in demand for hot-rolled and expects capacity operations throughout third quarter. Brokers in **Chicago** are offering considerable amounts of sheet at not much over mill price. Deliveries of cold-rolled are very current with some mills offering additional tonnages for delivery this month. Lots of **Detroit** material is being offered in **Chicago** without too much luck. Some cancellations reported at mills but, so far, no heavy waves of buying cutbacks. In **Detroit**, a few orders have been placed for 1957 steel. The **Philadelphia** sheet market is saturated. Third quarter acceptances being received at a slower rate. One company reports demand for cold-rolled fairly good from industries other than auto and agriculture. In **Cleveland**, auto producers are specifying about 50 pct of normal delivery for July and holding off their releases until the last possible moment, probably in September. Production of strip has dropped off 25-30 pct in the past few weeks. Revival hangs on stronger auto demand.

BARS . . . The **Chicago** market is unsettled. Hot-rolled bars have had some quota reductions recently and all mills should be current by the end of the month. Mills have some stocks of hot-rolled for quicker delivery. Large rounds a particular problem, and anything over three inches in diameter takes time to deliver. Cold-finished stock is available for immediate delivery in smaller sizes. Capacity operations expected during June with normal seasonal slowdown following. One **Detroit** mill reports a number of blanket auto orders for 1957 models, but no releases yet. Demand in **Philadelphia** is good, though with some easing of pressure. There is definite shortage of carbon bars in larger mill sizes. **West Coast** mills aren't too worried about the automotive slack; other users buying up entire production. Heavy hot-rolled bars in **Cleveland** are in easy demand for the third quarter. Books are expected to fill a little later in the month. Shortage of nickel is contributing to temporary local shortage of carbon bars in alloy bar facilities.

PLATE AND STRUCTURALS . . . Thin gage plate in narrow widths is more plentiful in **Pittsburgh** and local supply situations have given spot relief to some light plate users. But there is no prospect of general easing. Carryovers are kept within reasonable bounds only by placing rigid limits on orders. The **Detroit** light plate market also is easing but only because more mills are starting to roll it. No relief in sight for heavy plate and structurals. In **Philadelphia**, heavy demand from tank manufacturers, shipbuilders and fabricators continue to keep these products in short supply.

WAREHOUSES . . . Some major houses in **Chicago** report current business equal to May's record levels and for this reason are buying up everything they can. In a few cases this applies even to cold-rolled sheet. Light angles and small diameter bars are no longer a supply problem. In **Detroit** some firms are trying to build up better inventories even in sheet and strip. The feeling is they will be in good shape whether they face a strike or price rise. Incoming shipments from mills in **Cleveland** continue to increase except in plates and structurals. Inventories generally are far better balanced than they have been in months.

PIPE AND TUBING . . . Demand in **Pittsburgh** for oil country goods and mechanical specialties continues strong with possibility of carryovers going into fourth quarter. Oil country stock is one of the tightest lines in the **Philadelphia** market with demand for large electric weld and seamless items especially high. Smaller butt-weld sizes are in fairly good shape.

Purchasing Agent's Checklist

MARKETING: Metal bores into wood furniture market . . . . . p. 61

DISTRIBUTION: Gripes of nickel users are getting results . . . . p. 62

MARKETING: Electrical steel output is expanding . . . . . p. 63

Comparison of Prices

(Effective June 12, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	June 12 1956	June 5 1956	May 10 1956	May 17 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.325¢	4.325¢	4.325¢	4.05¢
Cold-rolled sheets	5.325	5.325	5.325	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.85	5.45
Hot-rolled strip	4.325	4.325	4.325	4.05
Cold-rolled strip	6.28	6.28	6.28	5.79
Plate	4.52	4.52	4.52	4.225
Plates, wrought iron	10.40	10.40	10.40	9.30
Stainl's C-R strip (No. 302)	44.50	44.50	44.50	41.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.85	$9.45*	$9.45*	$9.05
Tinplates, electro (0.50 lb.)	8.55	8.15*	8.15*	7.75
Special coated mfg. ternes	9.10	8.70*	8.70*	7.85
Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.65¢	4.30¢
Cold finished bars	5.90	5.90	5.90	5.40
Alloy bars	5.65	5.65	5.65	5.075
Structural shapes	4.60	4.60	4.60	4.25
Stainless bars (No. 302)	38.25	38.25	38.25	35.50
Wrought iron bars	11.50	11.50	11.50	10.40
Wire: (per pound)				
Bright wire	6.60¢	6.60¢	6.60¢	5.75¢
Rails: (per 100 lb.)				
Heavy rails	$4.725	$4.725	$4.725	$4.45
Light rails	5.65	5.65	5.65	5.35
Semifinish Steel: (per net ton)				
Rerolling billets	$68.50	$68.50	$68.50	$64.00
Slabs, rerolling	68.50	68.50	68.50	64.00
Forging billets	84.50	84.50	84.50	78.00
Alloy blooms, billets, slabs	96.00	96.00	96.00	86.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.025¢	5.025¢	5.025¢	4.675¢
Skelp	4.225	4.225	4.225	3.90
Finished Steel Composite: (per pound)				
Base price	5.179¢	5.179¢	5.179¢	4.797¢

	June 12 1956	June 5 1956	May10 1956	May 17 1955
Pig Iron: (per gross ton)				
Foundry del'd Phila.	$65.26	$65.26	$65.26	$61.19
Foundry Valley	60.50	60.50	60.50	56.50
Foundry, Southern Cin'ti	62.93	62.93	62.93	60.43
Foundry, Birmingham	55.00	55.00	55.00	52.88
Foundry, Chicago	60.50	60.50	60.50	56.50
Basic del'd Philadelphia	64.48	64.48	64.48	60.27
Basic, Valley furnace	60.00	60.00	60.00	56.00
Malleable, Chicago	60.50	60.50	60.50	56.50
Malleable, Valley	60.50	60.50	60.50	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	9.50¢
‡ 74.76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$60.29	$60.29	$60.29	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$44.50	$44.50	$54.50	$38.50
No. 1 steel, Phila. area	*46.50*	47.50	56.50	38.50
No. 1 steel, Chicago	*43.50*	45.50	54.50	35.50
No. 1 bundles, Detroit	37.50	37.50	51.50	29.00
Low phos., Youngstown	*50.50*	51.00	61.50	37.50
No. 1 mach'y cast, Pittsburgh	*55.50*	56.50	58.50	43.50
No. 1 mach'y cast, Philadel'a.	54.50	54.50	55.50	44.50
No. 1 mach'y cast, Chicago	*48.50*	49.50	56.50	46.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	*$44.83*	$45.83	$55.00	$37.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50	$14.50	$14.25	$14.38
Foundry coke, prompt	17.50	17.50	17.50	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	$46.00	$46.00	$46.00	$33.00
Copper, Lake, Conn.	46.00	46.00	46.00	36.00
Tin, Straits, New York	94.00†	93.625	98.375	90.625
Zinc, East St. Louis	13.50	13.50	13.50	11.50
Lead, St. Louis	15.80	15.80	15.80	14.80
Aluminum, virgin ingot	25.90	25.90	25.90	23.20
Nickel, electrolytic	64.50	64.50	64.50	67.67
Magnesium, ingot	34.50	34.50	34.50	27.75
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on p. 168→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	62.00	62.50	63.00	63.50	.....
Birdsboro, Pa. *B6*	62.00	62.50	63.00	63.50	.....
Birmingham *R3*	54.50	55.00*	.....	.....	.....
Birmingham *W9*	54.50	55.00*	59.00	.....	.....
Birmingham *U4*	54.50	55.00*	59.00	.....	.....
Buffalo *R3*	60.00	60.50	61.00	61.50	.....
Buffalo *H1*	60.00	60.50	61.00	.....	.....
Buffalo *W6*	60.00	60.50	61.00	61.50	.....
Chester *C17*	62.00	62.50	63.00	.....	.....
Chicago *I4*	60.00	60.50	60.50	61.00	.....
Cleveland *A5*	60.00	60.50	60.50	61.00	65.00†
Cleveland *R3*	60.00	60.50	60.50	61.00	.....
Duluth *I4*	60.00	60.50	60.50	61.00	65.00
Erie *I4*	60.00	60.50	60.50	61.00	65.00
Everett *M6*	.....	62.50	63.00	.....	.....
Fontana *K1*	67.50	68.00	.....	.....	.....
Geneva, Utah *C7*	60.00	60.50	.....	.....	.....
Granite City *G2*	61.90	62.40	62.90	.....	.....
Hubbard *Y1*	.....	.....	60.50	.....	.....
Lone Star *L3*	.....	55.00	.....	.....	.....
Midland *C11*	60.00	.....	.....	.....	.....
Minnequa *C6*	62.00	62.50	63.00	.....	.....
Monessen *P6*	60.00	.....	.....	.....	.....
Neville Is. *P4*	60.00	60.50	60.50	61.00	65.00†
N. Tonawanda *T1*	.....	60.50	61.00	61.50	.....
Pittsburgh *U1*	60.00	.....	60.50	61.00	.....
Sharpsville *S3*	60.00	60.50	60.50	61.00	.....
So. Chicago *R3*	60.00	.....	60.50	.....	.....
Steelton *B3*	62.00	62.50	63.00	63.50	68.00
Swedeland *A2*	62.00	62.50	63.00	63.50	.....
Toledo *I4*	60.00	60.50	60.50	61.00	.....
Troy, N. Y. *R3*	62.00	62.50	63.00	63.50	68.00
Youngstown *Y1*	.....	.....	60.50	61.00	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel * Add $1.00 for 0.31-0.69 pct phos. † Intermediate low phos.

Silvery Iron: Buffalo, *H1*, $70.25; Jackson, *J1*, *G1*, $69.00. Add $1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

Product	201	202	301	302	303	304	316	321	347	410	416	430
Ingots, reroll.	18.50	19.75	19.25	20.50	—	21.75	33.00	26.50	35.25	15.00	—	15.25
Slabs, billets, reroll.	23.00	25.50	23.75	26.25	26.75	27.50	41.75	33.50	44.50	19.50	—	19.75
Forg. dcs., die blks., rgs.	—	—	—	—	—	—	—	—	—	—	—	—
Billets, forging	—	31.00	31.75	32.00	34.75	33.75	52.75	39.75	52.50	25.50	26.00	26.00
Bars, struct.	—	36.75	38.00	38.25	41.00	40.25	62.75	47.25	62.00	30.50	31.00	31.00
Plates	—	38.75	40.00	40.25	42.75	43.00	66.00	51.25	66.75	31.75	33.00	32.25
Sheets	42.25	42.50	44.25	44.50	52.25	47.25	70.25	56.25	75.50	36.25	—	36.75
Strip, hot-rolled	31.00	33.50	32.00	34.50	—	37.25	59.75	45.75	61.25	28.00	—	28.75
Strip, cold-rolled	39.00	42.50	41.00	44.50	—	47.25	70.25	56.25	75.50	36.25	—	36.75
Wire CF, HR; Rod HR	—	—	36.00	36.25	39.00	38.25	59.75	45.00	59.00	29.00	29.50	29.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* McKeesport, Pa., *U1;* Washington, Pa., *W2* (2.25¢ lower on Type 430), *J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4;* Philadelphia, *D5.*

Strip: Midland, Pa., *C11;* Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton Massillon, O., *R3;* Middletown, O., *A7;* Harrison, N. J., *D3;* Youngstown, *C5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3,*(.25¢ per lb higher); *W1* (.25¢ per lb higher); New Bedford, Mass., *R6.*

Bar: Baltimore, *A7;* Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5;* Ft. Wayne, *I4;* Philadelphia, *D5;* Detroit, *R5.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11.*

Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Philadelphia, *D5.*

Forged discs, die blocks, rings: Pittsburgh, *C11;* Syracuse, *C11;* Ferndale, Mich., *A3;* Washington, Pa., *J2.*

Forgings billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5.*

Wait-and-See Brings Decline

Continued uncertainty results in limited activity and further slump in prices . . . Mills engage in only small-scale buying and place embargo on shipments after June.

◆ SCRAP BUYERS continue to hibernate this week while keeping a wary eye on progress of the steel wage talks. The net result is limited market activity with prices still moving downward.

Steelmaking grades are off $1 to $2 in some markets. Mills are placing orders only through the end of June and have put a tentative embargo on shipments after June 29.

Scrap shortage gave a somewhat firmer tone to the market in Pittsburgh, but it did not seem likely that brokers would bid prices up.

Mills that are buying are dealing in small tonnages with contracts including the holdup shipments clause. New orders at present prices are not encouraging movement and they are competing with older orders that are $2 and $3 over the existing market levels.

If there should be no strike, market sources look for prices to hold steady for another month. Belief is that mills are living off inventories and will have to re-build them if peace reigns.

The IRON AGE Composite, dropping a dollar, was down to $44.83.

Congress has agreed that there should be a study of the scrap export problem, but hasn't decided who's to do it. In approving a two-year extension of the export control act, the Senate Banking Committee asks the Bureau of Mines to survey the situation. The House earlier approved the extension, directed the Commerce Dept. to do so.

Pittsburgh . . . Prices of openhearth scrap are unchanged here and the flow of scrap both into and out of dealer yards has slowed to a walk. The shortage of scrap at today's prices has given a firmer tone to the market, but it is not likely that brokers will bid prices up to get delivery. For one thing, the possibility of a steel strike is creating uncertainty. Also, a portion of the recent mill orders call for 60 day shipment. Cast grades are off $1 to $2. Low phos is down $2 on foundry buying. Railroad specialities are down $1.

Chicago . . . In a relatively dull market marked by mill purchases in small quantities, the Chicago market continued its downward drift. Mill purchasing at new prices is not strong and heavy quantities of scrap continue to move on older orders established when the market had stronger price levels. Turnings, however, seem weak and though pegged by a sale last week, are the weakest grade on the list with a strong possibility of further declines in the near future. Small spot sales of electric furnace, cast and some railroad grades, continue to move at above prices established by major consumers in the area.

Philadelphia . . . Steel negotiations continue to be the big factor in keeping activity to a minimum. Mills that are buying are dealing in small tonnages, with contracts including a holdup shipments clause. Small purchase by local mill dropped price of No. 1 hvy melting $1, to $47, and No. 2 hvy melting $2, to $38. Only item showing any strength is unstripped motor blocks where an export order pushed price up $1 to $39.

New York . . . Steelmaking grades here have slipped $1 in the absence of new orders. Most mills have placed orders through balance of this month and have announced a tentative embargo on shipments effective June 29 until steel labor situation clarifies.

Detroit . . . The market here has reached a temporary levelling off stage. No new activity has been reported with both dealers and brokers awaiting the outcome of steel labor negotiations. If there is no strike, market sources look for prices to hold steady for another month. They reason that mills have been eating into scrap inventories and will have to build them back up.

Cleveland . . . Market slowed to a walk with one small sale of electric furnace grades in the Valley within quoted limits at $50 and a foundry sale in Cleveland of an unquoted grade of cut auto scrap at $45. Foundry is sticking exclusively to lower price scrap rather than previous 2 ft foundry steel at $3-4 higher.

Birmingham . . . Further weakness in the openhearth scrap market in this district was reflected this week in brokers' quotations, although buying is practically at a standstill, with mills apparently waiting to see how union negotiations progress. Electric furnace grades are in nominal demand with buyers testing the market and coming in for limited quantities at lower prices in order to keep the scrap moving. The cast market remains firm, while exports still are very quiet.

St. Louis . . . Because of recent heavy shipments, plus uncertainty as to results of wage negotiations in the steel industry, the scrap market made further price recessions during the week. Steel mills are generally staying out of the market. Railroad lists by three companies brought lower prices as expected. The price of reroller rails was incorrectly listed in last week's issue and should have been $65-66.

Cincinnati . . . After last week's price drop through local sale, market has shown no activity. Prospects are for a dull few weeks. Dealers are shipping against monthly orders, but no new ones in prospect until next month. Dealer inventories are about normal. Almost all types of foundry buying are near a standstill.

Buffalo . . . Prices of some grades dropped about $2 a ton on the basis of limited sales this week. Mills are asking for immediate shipment with a June 21 deadline.

Boston . . . There is very little market activity here as a waiting policy develops due to steel labor talks. Prices are unchanged. Buyers are few and there are no export sales.

West Coast . . . Mills are easing up on purchases in Los Angeles and Seattle. One major mill isn't buying at all. Exporting continues fairly active, with three cargoes to leave the San Francisco Bay Area this month.

FOR EASY FABRICATION. At Young Machinery Company, Muncy, Pa., this man, like all good welders, has no trouble with Stainless Steel in the shop. Both electric and heliarc welding are used extensively on Stainless. Fabricating operations are different, but they're not difficult.

FOR HARD SERVICE. This Kooler-Grill is made by the Victor Products Corporation. It grills 200 hot dogs per hour, heats the buns and stores plenty of ice cold drinks. USS Stainless Steel is used for all the areas subjected to hard service—where other materials would chip, dent or corrode.

NOTHING *can equal* *Stainless Steel*

in its combination of desirable properties

No other design material can match Stainless Steel in its combination of desirable properties: corrosion resistance, strength and hardness, beauty, cleanability and easy fabrication. When seeking a source of supply, remember that United States Steel offers you the widest range of types, finishes and sizes.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO · NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS
PIPE · TUBES · WIRE · SPECIAL SECTIONS

USS

UNITED STATES STEEL

FOR LONG LIFE. In 1934, the Burlington Zephyr startled the world with an *average speed* of 77.61 mph between Denver and Chicago. That original train is still in service after rolling about 3 million miles, and the Stainless Steel exterior remains in perfect condition.

Scrap Prices *(Effective June 12, 1956)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 bundles	44.00 to 45.00
No. 2 bundles	36.00 to 37.00
Machine shop turn.	32.00 to 33.00
Mixed bor. and ms. turn.	32.00 to 33.00
Shoveling turnings	36.00 to 37.00
Cast iron borings	36.00 to 37.00
Low phos. punch'gs plate	51.00 to 52.00
Heavy turnings	42.00 to 43.00
No. 1 RR. hvy. melting	51.00 to 52.00
Scrap rails, random lgth.	62.00 to 63.00
Rails 2 ft and under	66.00 to 67.00
R.R. steel wheels	58.00 to 59.00
RR. spring steel	58.00 to 59.00
RR. couplers and knuckles	58.00 to 59.00
No. 1 machinery cast	55.00 to 56.00
Cupola cast	47.00 to 48.00
Heavy breakable cast	47.00 to 48.00

Chicago

No. 1 hvy. melting	$43.00 to $44.00
No. 1 hvy. melting	36.00 to 37.00
No. 1 factory bundles	44.00 to 45.00
No. 1 dealers' bundles	44.00 to 45.00
No. 2 dealers' bundles	32.00 to 33.00
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	25.00 to 26.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	25.00 to 26.00
Low phos. forge crops	54.00 to 55.00
Low phos. punch'gs plate	52.00 to 53.00
Low phos. 3 ft and under	50.00 to 52.00
No. 1 RR. hvy. melting	50.00 to 52.00
Scrap rails, random lght.	61.00 to 62.00
Rerolling rails	69.00 to 70.00
Rails 2 ft and under	68.00 to 69.00
Locomotive tires, cut	55.00 to 56.00
Cut bolsters & side frames	55.00 to 56.00
Angles and splice bars	61.00 to 62.00
RR. steel car axles	68.00 to 70.00
RR. couplers and knuckles	54.00 to 55.00
No. 1 machine cast	48.00 to 49.00
Cupola cast	44.00 to 45.00
Heavy breakable cast	38.00 to 39.00
Cast iron brake shoe	38.00 to 39.00
Cast iron wheel	49.00 to 50.00
Malleable	58.00 to 59.00
Stove plate	41.00 to 42.00
Steel car wheels	54.00 to 56.00

Philadelphia Area

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	46.00 to 47.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	31.00 to 32.00
Mixed bor. short turn.	33.00 to 34.00
Cast iron borings	37.00 to 38.00
Shoveling turnings	36.00 to 37.00
Clean cast chem. borings	43.00 to 44.00
Low phos. 5 ft and under	50.00 to 51.00
Low phos. 2 ft and under	51.00 to 52.00
Low phos. punch'gs	51.00 to 52.00
Elec. furnace bundles	49.00 to 50.00
Heavy turnings	43.00 to 44.00
RR. steel wheels	58.00 to 59.00
RR. spring steel	58.00 to 59.00
Rails 18 in. and under	63.00 to 64.00
Cupola cast	47.00 to 48.00
Heavy breakable cast	50.00 to 51.00
Cast iron car wheels	57.00 to 58.00
Malleable	64.00 to 65.00
Unstripped motor blocks	38.00 to 39.00
No. 1 machinery cast	54.00 to 55.00

Cleveland

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	47.00 to 48.00
No. 2 bundles	33.00 to 34.00
No. 1 busheling	47.00 to 48.00
Machine shop turn.	30.00 to 31.00
Mixed bor. and turn.	34.00 to 35.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	34.00 to 35.00
Cut struct'r'l & plates, 2 ft & under	51.00 to 52.00
Drop forge flashings	47.00 to 48.00
Low phos. punch'gs, plate	48.50 to 49.50
Foundry steel, 2 ft & under	49.00 to 50.00
No. 1 RR. heavy melting	50.00 to 51.00
Rails 2 ft and under	68.00 to 69.00
Rails 18 in. and under	69.00 to 70.00
Railroad grate bars	39.00 to 40.00
Steel axle turnings	37.00 to 38.00
Railroad cast	54.00 to 55.00
No. 1 machinery cast	54.00 to 55.00
Stove plate	51.00 to 52.00
Malleable	59.00 to 60.00

Youngstown

No. 1 hvy. melting	$49.00 to $50.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 bundles	49.00 to 50.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	30.00 to 31.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	35.00 to 36.00
Low phos. plate	50.00 to 51.00

Buffalo

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 busheling	44.00 to 45.00
No. 1 bundles	44.00 to 45.00
No. 2 bundles	33.00 to 34.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	27.00 to 28.00
Low phos. plate	53.00 to 54.00
Scrap rails, random lgth.	57.00 to 58.00
Rails 2 ft and under	65.00 to 66.00
RR. steel wheels	60.00 to 61.00
RR. spring steel	60.00 to 61.00
RR. couplers and knuckles	60.00 to 61.00
No. 1 machinery cast	50.00 to 51.00
No. 1 cupola cast	48.00 to 49.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 bundles, openhearth	37.00 to 38.00
No. 2 bundles	26.50 to 27.50
New busheling	37.00 to 38.00
Drop forge flashings	36.50 to 37.50
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	22.00 to 23.00
Low phos. punch'gs, plate	37.00 to 38.00
No. 1 cupola cast	41.00 to 42.00
Heavy breakable cast	34.00 to 35.00
Stove plate	35.00 to 36.00
Automotive cast	44.00 to 45.00

St. Louis

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	30.00 to 31.00
Machine shop turn.	26.00 to 27.00
Cast iron borings	27.00 to 28.00
Shoveling turnings	27.00 to 28.00
No. 1 RR. hvy. melting	48.50 to 49.50
Rails, random lengths	53.00 to 54.00
Rails 18 in. and under	62.00 to 63.00
Locomotive tires uncut	50.00 to 51.00
Angles and splice bars	50.00 to 51.00
Std. steel car axles	56.00 to 57.00
RR. specialties	54.00 to 55.00
Cupola cast	46.00 to 47.00
Heavy breakable cast	32.00 to 33.00
Cast iron brake shoes	42.00 to 43.00
Stove plate	40.00 to 41.00
Cast iron car wheels	43.00 to 44.00
Rerolling rails	65.00 to 66.00
Malleable	58.00 to 59.00
Unstripped motor blocks	32.00 to 33.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	28.00 to 28.50
No. 1 bundles	35.00 to 36.00
No. 2 bundles	27.00 to 27.50
No. 1 busheling	35.00 to 36.00
Elec. furnace, 3 ft & under	37.00 to 38.00
Machine shop turn.	20.00 to 20.50
Mixed bor. and short turn.	26.00 to 26.50
Shoveling turnings	27.00 to 27.50
Clean cast chem. borings	29.00 to 30.00
No. 1 machinery cast	42.50 to 43.00
Mixed cupola cast	38.00 to 39.00
Heavy breakable cast	39.50 to 40.50
Stove plate	37.00 to 38.00
Unstripped motor blocks	25.50 to 26.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	30.00 to 31.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	28.00 to 29.00
Clean cast chem. borings	31.00 to 32.00
No. 1 machinery cast	47.00 to 47.50
Mixed yard cast	44.00 to 44.50
Charging box cast	44.00 to 44.50
Heavy breakable cast	44.00 to 44.50
Unstripped motor blocks	32.00 to 33.00

Birmingham

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 bundles	34.00 to 35.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	25.00 to 26.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	20.00 to 21.00
Electric furnace bundles	40.00 to 41.00
Bar crops and plate	51.00 to 52.00
Structural and plate, 2 ft	50.00 to 51.00
No. 1 RR. hvy. melting	45.00 to 46.00
Scrap rails, random lgth.	56.00 to 57.00
Rails, 18 in. and under	60.00 to 61.00
Angles & splice bars	55.00 to 56.00
Rerolling rails	65.00 to 66.00
No. 1 cupola cast	48.50 to 49.50
Stove plate	47.00 to 48.00
Charging box cast	32.00 to 33.00
Cast iron car wheels	39.00 to 40.00
Unstripped motor blocks	37.50 to 38.50
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$42.50 to $43.50
No. 2 hvy. melting	33.50 to 34.50
No. 1 bundles	42.50 to 43.50
No. 2 bundles	31.50 to 32.50
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	28.00 to 29.00
Low phos. 18 in. & under	52.00 to 53.00
Rails, random lengths	58.00 to 59.00
Rails, 18 in. and under	65.00 to 66.00
No. 1 cupola cast	43.00 to 44.00
Hvy. breakable cast	43.00 to 44.00
Drop broken cast	53.00 to 54.00

San Francisco

No. 1 hvy. melting	$43.00
No. 2 hvy. melting	40.00
No. 1 bundles	42.00
No. 2 bundles	35.00
No. 3 bundles	29.00
Machine shop turn.	24.00
Cast iron borings	25.00
No. 1 RR. hvy. melting	43.00
No. 1 cupola cast	48.00

Los Angeles

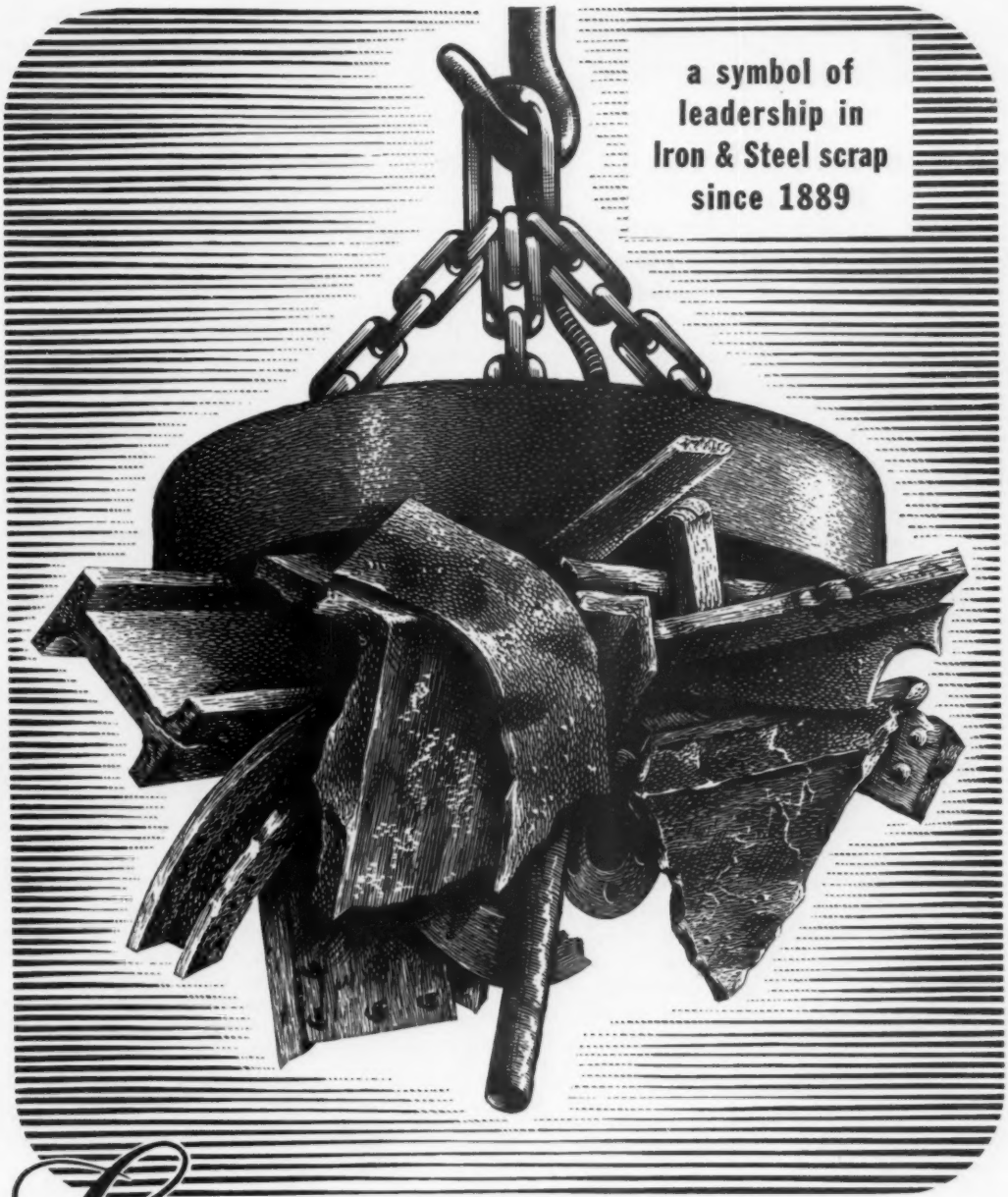
No. 1 hvy. melting	$42.00
No. 2 hvy. melting	38.00
No. 1 bundles	41.00
No. 2 bundles	31.00
No. 3 bundles	27.00
Machine shop turn.	$21.00 to 22.00
Shoveling turnings	24.00
Cast iron borings	24.00
Elec. furn. 1 ft and under	42.00
No. 1 RR. hvy. melting	42.00
No. 1 cupola cast	45.00

Seattle

No. 1 hvy. melting	$44.00
No. 2 hvy. melting	40.00
No. 2 bundles	31.00
No. 3 bundles	27.00
No. 1 cupola cast	45.00
Mixed yard cast	45.00

Hamilton, Ont.

No. 1 hvy. melting	$45.00
No. 2 hvy. melting	40.00
No. 1 bundles	45.00
No. 2 bundles	37.50
Mixed steel scrap	39.00
Bushelings	35.50
Bush., new fact., prep'd	43.00
Bush., new fact., unprep'd	39.00
Machine shop turn.	23.00
Short steel turn.	28.00
Mixed bor. and turn.	24.00
Rails, rerolling	53.00
Cast scrap	50.00



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EXPORTS-IMPORTS LIVINGSTON & SOUTHARD, INC. 99 Park Ave., New York, N. Y. *Cable Address:* **FORENTRACO**

Zinc for Food Barter Starts

ODM approves plan to barter food surplus for foreign lead and zinc . . . Metal will go to supplementary stockpile . . . Opinion divided on possible effect.

◆ OFFICE of Defense Mobilization made up its mind in a hurry. Plan to barter surplus American food and farm goods for lead and zinc on foreign markets, has been established under the Agricultural Trade Development and Assistance Act, and will be put into effect immediately.

In fact, acceptances have already been sent out to some of the sources which submitted offers of metal when the possibility of such a plan was announced in May.

At that time ODM officials had insisted that there was little likelihood of the plan being put into operation in the near future.

Since the metal obtained will be assigned to a supplemental stockpile, and everything connected with the stockpile is considered classified information, there is no official word on how much metal actually will be obtained.

General industry opinion ranges from 40,000 to 50,000 tons, with emphasis on zinc. Other than hazarding unofficial guesses as to how much, lead and zinc producers have been officially silent as to agreement or disagreement with the government move.

Many have come to the conclusion, generally speaking, that such a move will probably help strengthen European markets which showed signs of weakening, and which could have eventually pulled the American market down.

However, with automotive production off, zinc shipments and orders off, producers are concerned about effect this foreign metal will have on the amount of their metal which will be accepted for stockpiling.

Most report they offered General Services Administration more zinc for stockpiling in May than in any previous month. Little probably will be said by producers until next GSA call for zinc. Amount accepted could be deciding factor.

Lead, on the other hand, is comfortable despite a very slow market. Many consumers are bringing inventories down to low levels for bookkeeping purposes, at end of a fiscal year, and are expected back in the market on large scale at end of the month. Thus producers are not as concerned, currently, about government absorbing surplus stocks.

Rules under which barter must be carried out include (1) price must not be higher than prevailing domestic rate, (2) seller must pay import duties and transportation charges, (3) seller must pay commission for handling transaction.

Surplus farm products eligible to be bartered amount to many millions of dollars. If everything works out, ODM reports it will try to obtain other strategic metals, including bauxite, beryllium copper, cobalt, magnesium and manganese in the same manner.

COPPER . . . To change or not to change—that is the question, and it has got copper consumers puzzled. Custom smelters are holding their price at 40¢ per lb. London Metals Exchange price, after slight recovery dropped again, to about 37.25¢ per lb. Rhodesian Selection Trust Group is selling at 40¢. Latest to drop around this level is Belgian Congo Company—Union Miniere du Haut Katanga—to 40.40¢. But American producers are still selling both domestic and Chilean copper at 46¢.

Several major brass mills have dropped average price they figure they have to pay for copper, on which they base their product prices, to 43¢ per lb.

Under this kind of pressure domestic producers would normally be almost forced to drop prices about 3¢. But these are not normal months. Initially, companies are faced with severe bargaining sessions with Mine, Mill & Smelter Workers Union. About 15¢ to 20¢ wage increase in inevitable. But even this would not be enough to keep the 46¢ platform under producers copper—despite the fact that it is almost traditional to raise prices along with wages.

Strike—is the word. If it comes, anything like in 1955, the industry will be in trouble. Maybe it's whistling in the dark, but several producers anticipate no work stoppage in the remainder of 1956—insist that prices will probably drop back to 43¢ sometime in July.

TIN . . . British government, one of the consumer signers of the International Tin Agreement, has called a meeting of all ratifying countries for June 29, to decide when to officially put agreement into effect.

The first meeting of the governing council will take place near the beginning of July. At this time plans for establishing the buffer supply will be formulated. Initial call will ask producing countries to deliver about 15,000 tons to the Council. Barring any further trouble on the Malayan docks, world price should stay low enough to accomplish this without much strain. If so, it would mean a better than 50-50 chance for a more stable tin price.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	June 6	June 7	June 8	June 9	June 11	June 12
Copper, electro, Conn.	46.00	46.00	46.00	46.00	46.00	46.00
Copper, Lake, delivered	46.00	46.00	46.00	46.00	46.00	46.00
Tin, Straits, New York	93.875	94.125	94.125	....	94.125	94.00*
Zinc, East St. Louis	13.50	13.50	13.50	13.50	13.50	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80

Note: Quotations are going prices. **Tentative*

NO ICE TODAY!
NO ACID BITE!

Keystone Aluminum Conductor System Brings Trouble-Free Service To Buffalo Plant

NIAGARA MOHAWK POWER COMPANY has ended a second winter without a shutdown of these coal storage towers. Another trouble-free record for KEYSTONE Aluminum Conductor Systems.

Service conditions are severe in the lake city. This outdoor installation formerly had a big ice problem with the original wire system, but ice can't form on the enclosed KEYSTONE inverted-V conductors. Sulphuric acid fumes from the coal piles won't corrode KEYSTONE's Aluminum Conductors, hangers and joint plates.

The KEYSTONE Integrated Aluminum Conductor System has installation advantages too. Lightweight, compact, easy to erect—an ideal system for the enclosure requirements of these leading towers.

Are you building or modernizing a materials handling system? Then you'll be interested in systems of aluminum, copper or steel. We build them *all*. Our engineers will be glad to discuss the proper application for your requirements.

WRITE TODAY FOR CASE HISTORY BOOKLET ON ALUMINUM CONDUCTOR SYSTEM INSTALLATIONS.

KEYSTONE SAVES 3 WAYS

1. **LONGER LIFE for conductors; aluminum lasts longer in destructive atmospheres. Longer shoe life; contact surfaces stay smoother, cleaner. Longer insulator life; less vibrating weight. No downtime from ice.**
2. **LIGHTWEIGHT aluminum permits pre-assembly of standard units; reduces installation costs and cost of insulators and supporting structures. Permits economical enclosures to safeguard personnel and operations.**
3. **HIGH CURRENT CAPACITY, low voltage drop. No need for boosters, multi-point feeds on long runways. Pre-engineered systems now operating up to 6,000 amp. capacity. Amperage possibilities unlimited.**

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ELECTRIC SERVICE MANUFACTURING CO.

PHILADELPHIA 32, PENNA.

Nonferrous Prices *(Effective June 12, 1956)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136-.249	.250-3.
1100, 3003	42.3	40.2	39.0	38.0
5052	49.8	44.9	43.2	41.4
6061-0	46.9	42.7	40.9	40.8

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6- 8	43.1-44.8	58.1-61.7
12-14	43.8-45.2	59.0-63.3
24-26	46.8-47.2	69.2-73.6
36-38	55.1-55.7	92.0-95.8

Screw Machine Stock—2011-T-3

Size*	¼	⅜-½	¾-1	1¼-1½
Price	56.0	54.9	53.6	51.6

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length" →	72	96	120	144
.019 gage	$1.310	$1.742	$2.175	$2.605
.024 gage	1.630	2.177	2.707	3.247

MAGNESIUM

(f.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type→ Gage→	.250-3.00	.250-2.00	.188	.081	.032
FS1 Stand. Grade	.....	65.6	66.5	75	100
FS1 Spec.	.....	88.9	91.1	103.5	163.1
Tread Plate	.....	67.8	68.9	.....	.....
Tooling Plate	70.2	.....	.....	.....	.....

Extruded Shapes

factor →	6-8	12-14	24-26	36-38
Comm. Grade (FS)	66.4-69.0	67.5-69.6	72.1-72.7	84.9-85.8
Spec. Grade (AZ31B)	81.4-84.0	82.5-84.6	87.1-87.7	99.9-100.8

Alloy Ingot

AZ91B (Die Casting) ..... 35 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 39.25(Velasco,Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	83	99
Strip, CR	102	92	125
Rod, Bar, HR	87	74	93
Angles, HR	87	74	93
Plate, HR	97	87	95
Seamless tube	122	110	153
Shot, blocks	...	71	...

COPPER, BRASS, BRONZE

(Freight included on 500 lbs)

	Sheet	Wire	Rod	Tube
Copper	68.63	.....	.....	68.82
Brass, 70/30	56.60	57.14	.....	59.51
Brass, Low	61.35	61.89	61.29	64.16
Brass, R L	63.07	63.61	63.01	65.88
Brass, Naval	59.80	65.06	54.11	62.96
Munts Metal	57.84	51.85	53.65	.....
Comm. Bz.	65.33	65.87	65.27	67.89
Mang. Bz.	63.84	66.19	57.64	.....
Phos. Bz. 5%	86.79	84.44	87.29	.....

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $12.10-$12.60; alloy, $15.00-$15.75; Plate, HR, commercially pure, $10.00-$10.50; alloy, $11.50-$12.00. Wire, rolled and/or drawn, commercially pure, $9.00-$11.50; alloy, $11.50; Bar, HR or forged, commercially pure, $7.55-$7.80; alloy, $7.55-$7.75.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb. freight alloyed	$0.90
Aluminum pig	24.00
Antimony, American, Laredo, Tex.	33.50
Beryllium copper, per lb conta'd Be	$43.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$74.75
Bismuth, ton lots	$ 2.25
Cadmium, del'd	$ 1.70
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	46.00
Copper, Lake, delivered	46.00
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.9% dollars per troy oz.	$ 2.25
Iridium, dollars per troy oz.	$100 to $120
Lead, St. Louis	15.80
Lead, New York	16.00
Magnesium, 99.8+%, f.o.b. Velasco, Tex., 10,000 lb, pig	33.75
ingot	34.50
Magnesium, sticks, 100 to 500 lb.	56.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$261 to $263
Nickel electro	64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel	60.75
Palladium, dollars per troy oz.	$23 to $24
Platinum, dollars per troy oz.	$103 to $105
Silver, New York, cents per troy oz.	90.7*
Tin, New York	94.00*
Titanium sponge, grade A-1	$2.95 to $3.25
Zinc, East St. Louis	13.50
Zinc, New York	14.00
Zirconium sponge	$10.00

*Tentative

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	37.00
No. 120	35.75
No. 123	34.75
80-10-10 ingot	
No. 305	40.25
No. 315	38.50
88-10-2 ingot	
No. 210	51.75
No. 215	48.00
No. 245	43.00
Yellow ingot	
No. 405	28.75
Manganese bronze	
No. 421	32.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper max.	25.75-26.25
0.60 copper max.	25.50-26.00
Piston alloys (No. 122 type)	25.00-25.50
No. 12 alum. (No. 2 grade)	23.75-24.50
108 alloy	24.00-24.50
195 alloy	25.75-26.25
13 alloy (0.60 copper max.)	25.50-26.00
AXS-679	24.00-24.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½%	24.00-24.50
Grade 2—92-95%	23.25-24.75
Grade 3—90-92%	22.50-23.00
Grade 4—85-90%	22.00-22.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	42	41¼
Yellow brass	31¼	29
Red brass	37	36¼
Comm. bronze	38½	37¾
Mang. bronze	28½	28½
Yellow brass rod ends	31	....

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	33½—34
No. 2 copper wire	32 —32½
Light copper	29½—30
*Refinery brass	29

* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	33½—34
No. 2 copper wire	32 —32½
Light copper	29½—30
No. 1 composition	26½
No. 1 comp. turnings	26
Hvy. yellow brass solids	18½
Brass pipe	18½
Radiators	20

Aluminum

Mixed old cast.	15 —16
Mixed new clips	16 —17
Mixed turnings, dry	15 —16

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	31 —31½
No. 2 copper wire	28 —28½
Light copper	25½—26
New type shell cuttings	26 —26½
Auto radiators (unsweated)	17 —17½
No. 1 composition	23 —23½
No. 1 composition turnings	22 —22½
Unlined red car boxes	18 —19
Cocks and faucets	18½—19
Clean heavy yellow brass	15½—16
Brass pipe	20½—21
New soft brass clippings	22 —22½
No. 1 brass rod turnings	19½—20

Aluminum

Alum. pistons and struts	6 — 7
Aluminum crankcases	11 —11½
1100 (2S) aluminum clippings	15 —15½
Old sheet and utensils	11 —11½
Borings and turnings	8 — 8½
Industrial castings	11 —11½
2024 (24S) clippings	12½—13

Zinc

New zinc clippings	5 — 5½
Old zinc	5 — 5½
Zinc routings	3¾
Old die cast scrap	2¾— 3

Nickel and Monel

Pure nickel clippings	$1.50-$1.75
Clean nickel turnings	$1.25
Nickel anodes	$1.50-$1.75
Nickel rod ends	$1.50-$1.75
New Monel clippings	75-85
Clean Monel turnings	60-70
Old sheet Monel	65-75
Nickel silver clippings, mixed	21
Nickel silver turnings, mixed	18

Lead

Soft scrap lead	12½—13
Battery plates (dry)	7 — 7¼
Batteries, acid free	4½

Miscellaneous

Block tin	82 —84
No. 1 pewter	62½—63
Auto babbitt	42 —42½
Mixed common babbitt	13½—14
Solder joints	18½—19
Siphon tops	48
Small foundry type	15¾—16
Monotype	15 —15½
Lino. and stereotype	13½—14
Electrotype	13 —13¼
Hand picked type shells	10½—11
Lino. and stereo. dross	5¾— 6
Electro. dross	4¾— 5

IRON AGE

STEEL PRICES

(Effective June 12, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$96.00 *B3*		4.65 *B3*	6.80 *B3*	4.65 *B3*						
	Buffalo, N. Y.	$68.50 *B3*	$84.50 *R3, B3*	$96.00 *R3, B3*	5.45 *B3*	4.65 *B3*	6.80 *B3*	4.65 *B3*	4.325 *R3,B3*	6.25 *B3* 6.25 *R7,S10*	6.425 *B3*	9.10 *B3*		
	Claymont, Del.													13.45 *C11*
	Harrison, N. J.													
	Conshohocken, Pa.								4.375 *A2*	6.30 *A2*	6.425 *A2*			
	New Bedford, Mass.									6.70 *R6*				
	Johnstown, Pa.	$68.50 *B3*	$84.50 *B3*	$96.00 *B3*		4.65 *B3*	6.80 *B3*							
	Boston, Mass.									6.80 *T8*				13.80 *T8*
	New Haven, Conn.									6.70 *D1 A5*				
	Phoenixville, Pa.					5.15 *P2*		5.15 *P2*						
	Sparrows Pt., Md.								4.325 *B3*	6.25 *B3*	6.425 *B3*	9.10 *B3*		
	Bridgeport, Wallingford, Conn.	$73.50 *N8*	$89.50 *N8*						4.625 *N8*	6.70 *W1*			7.50 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.80 *N7 A5*				*A5* 13.80 *N7*
MIDDLE WEST	Alton, Ill.								4.50 *L1*					
	Ashland, Ky.								4.325 *A7*					
	Canton-Massillon, Dover, Ohio		$86.50 *R3*	$96.00 *R3*										13.45 *G4*
	Chicago, Ill.	$68.50 *U1*	$84.50 *R3, U1,W8*	$96.00 *R3, U1,W8*	5.45 *U1*	4.60 *U1, W8*	6.75 *U1, Y1*	4.60 *U1*	4.55 *A1* 4.325 *N4,W8*	6.35 *A1,T8*			7.20 *W8*	13.45 *T8*
	Cleveland, Ohio									6.25 *A5,J3*		9.30 *A5*		13.45 *A5*
	Detroit, Mich.			$96.00 *R5*					4.425 *G3,M2*	6.35 *D1,D2, G3,M2,P11*	6.525 *G3*	9.20 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$68.50 *U1*	$84.50 *U1*	$96.00 *U1, Y1*	6.45 *I3*	4.60 *U1 I3*	6.75 *U1, I3*		4.325 *I3, U1,Y1*	6.35 *I3* 6.25 *Y1*	6.425 *I3, U1,Y1*	9.30 *Y1*	7.20 *Y1, U1*	
	Sterling, Ill.								4.425 *N4*					
	Indianapolis, Ind.									6.40 *C5*				
	Newport, Ky.												7.20 *N5*	
	Middletown, Ohio									6.45 *A7*				
	Niles, Warren, Ohio Sharon, Pa.	$68.50 *C10*	$84.50 *C1*	$96.00 *C10*					4.325 *S1, R3*	6.25 *S1, R3,T4*	6.425 *S1, R3*	9.10 *S1, R3*	7.20 *S1*	13.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$68.50 *U1, J3*	$84.50 *J3, U1,C11*	$96.00 *U1, C11*	5.45 *U1*	4.60 *U1, J3*	6.75 *U1, J3*	4.60 *U1*	4.325 *P6*	6.25 *S7,B4*			7.20 *S9*	13.45 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					4.60 *W3*			4.325 *W3*	6.25 *F3,W3*	6.425 *W3*	9.10 *W3*		
	Youngstown, Ohio		$84.50 *C10*	$96.00 *Y1, C10*			6.75 *Y1*		4.325 *U1, Y1*	6.25 *Y1,C5*	6.425 *U1, Y1*	9.30 *Y1*	7.20 *U1, Y1*	13.45 *C5*
WEST	Fontana, Cal	$78.00 *K1*	$94.00 *K1*	$117.00 *K1*		5.30 *K1*	7.40 *K1*	5.45 *K1*	5.125 *K1*	8.00 *K1*	7.575 *K1*		8.95 *K1*	
	Geneva, Utah		$84.50 *C7*			4.60 *C7*	6.75 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	
	Los Angeles, Torrance, Cal.		$94.00 *B2*	$116.00 *B2*		5.30 *C7, B2*	7.45 *B2*		5.875 *C7 B2*	8.30 *C1*			8.40 *B2*	
	Minnequa, Colo.					4.90 *C6*			5.425 *C6*					
	Portland, Ore.					5.35 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$94.00 *B2*			5.25 *B2, P9*	7.40 *B2*		5.875 *B2, C7*					
	Seattle, Wash.		$98.00 *B2*			5.35 *B2*	7.50 *B2*		5.325 *B2*					
SOUTH	Atlanta, Ga.								4.525 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$69.50 *T2*	$84.50 *T2*			5.10 *C16* 4.60 *R3,T2*	6.75 *T2*		4.325 *R3,T2* 4.825 *C10*		6.425 *T2*			
	Houston, Lone Star, Texas	$74.50 *L3*	$89.50 *S2*	$101.00 *S2*		4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	

STEEL PRICES

(Effective June 12, 1956)

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		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot rolled *19* ga.		Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.325 *B3*	5.325 *B3*				6.375 *B3*	7.875 *B3*			5.375 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.375 *A2*	5.375 *A2*				6.425 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.375 *B3*			
	Fairless, Pa.	4.375 *U1*	5.375 *U1*				6.425 *U1*	7.925 *U1*				$9.70 *U1*	$8.40 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.325 *B3*	5.325 *B3*	5.85 *B3*			6.375 *B3*	7.875 *B3*	8.60 *B3*		5.475 *B3*	$9.70 *B3*	$8.40 *B3*	
	Worcester, Mass.										5.675 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										5.55 *L1*			
	Ashland, Ky.	4.325 *A7*		5.85 *A7*	5.90 *A7*									
	Canton-Massillon, Dover, Ohio			5.85 *R1, R3*										
	Chicago, Joliet, Ill.	4.55 *A1* 4.325 *W8*					6.375 *U1*				5.375 *N4* 5.375 *A5, R3*			
	Sterling, Ill.										5.475 *N4*			
	Cleveland, Ohio	4.325 *J3, R3*	5.325 *J3, R3*		5.90 *R3*		6.375 *J3, R3*	7.875 *J3, R3*			5.375 *A5*			
	Detroit, Mich.	4.425 *G3, M2*	5.425 *G3* 5.325 *M2*				6.475 *G3*	7.975 *G3*						
	Newport, Ky.	4.325 *N5*	5.325 *N5*	5.85 *N5*										
	Gary, Ind. Harbor, Indiana	4.325 *I3, U1, Y1*	5.325 *I3, U1, Y1*	5.85 *U1, I3*	5.90 *U1, I3*	6.25 *U1*	6.375 *Y1, U1, I3*	7.875 *U1, Y1*			5.375 *Y1*	$9.60 *I3, U1, Y1*	$8.30 *I3, U1, Y1*	7.05 *U1, Y1*
	Granite City, Ill.	4.525 *G2*	5.525 *G2*	6.05 *G2*	6.10 *G2*								$8.40 *G2*	7.15 *G2*
	Kokomo, Ind.			5.95 *C9*							5.475 *C9*			
	Mansfield, Ohio	4.325 *E2*	5.325 *E2*			6.25 *E2*								
	Middletown, Ohio		5.325 *A7*	5.85 *A7*	5.90 *A7*	6.25 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.325 *S1, R3, N3*	5.325 *R3, N3*	5.85 *R3* 6.85 *N3*	5.90 *N3*	6.25 *N3*	6.375 *S1, R3*	7.875 *R3*					$8.30 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 *J3, U1, P6*	5.325 *J3, U1, P6*	5.85 *U1*	5.90 *U1, A7*		6.375 *J3, U1*	7.875 *U1*	8.60 *U1*		5.025 *P6* 5.375 *A5*	$9.60 *J3, U1*	$8.30 *J3, U1*	7.05 *U1*
	Portsmouth, Ohio	4.325 *P7*	5.325 *P7*								5.375 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.325 *W3, W5*	5.325 *W3, W5, F3*	5.85 *W3, W5*		6.25 *W3, W5*	6.375 *W3*	7.875 *W3*				$9.60 *W3, W5*	$8.30 *W3, W5*	7.05 *F3, W5*
	Youngstown, Ohio	4.325 *U1, Y1*	5.325 *Y1*		5.90 *Y1*		6.375 *U1, Y1*	7.875 *Y1*			5.375 *Y1*			
WEST	Fontana, Cal.	5.125 *K1*	6.525 *K1*				7.175 *K1*	9.075 *K1*				$10.35	$9.05	$8.15
	Geneva, Utah	4.425 *C7*												
	Kansas City, Mo.										5.625 *S2*			
	Los Angeles, Torrance, Cal.										6.175 *B2*			
	Minnequa, Colo.										5.625 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.025 *C7*	6.275 *C7*	6.00 *C7*							5.675 *C7*	$10.35 *C7*	$9.05 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.325 *R3, T2*	5.325 *T2*	5.85 *R3, T2*			6.375 *T2*			5.625 *R3*	5.025 *R3* 5.375 *T2*	$9.70 *T2*	$8.40 *T2*	
	Houston, Tex.										5.625 *S2*			

IRON AGE

STEEL PRICES

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		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem				5.575 *B3*	7.425 *B3*	6.80 *B3*					
	Buffalo, N. Y.	4.65 *B3,R3*	4.65 *B3,R3*	6.30 *B5*	5.575 *B3,R3*	7.425 *B3,B5*	6.80 *B3*	4.50 *B3,R3*				6.60 *W6*
	Claymont, Del.							5.35 *C4*		6.30 *C4*	6.725 *C4*	
	Coatesville, Pa.							4.80 *L4*		6.30 *L4*	6.725 *L4*	
	Conshohocken, Pa.							4.50 *A2*	5.575 *A2*		6.725 *A2*	
	Harrisburg, Pa.							5.10 *P2*	5.575 *C3*			
	Hartford, Conn.			6.75 *R3*		7.725 *R3*						
	Johnstown, Pa.	4.65 *B3*	4.65 *B3*		5.575 *B3*		6.80 *B3*	4.50 *B3*		6.30 *B3*	6.725 *B3*	6.60 *B3*
	Fairless, Pa.	4.80 *U1*	4.80 *U1*		5.725 *U1*							
	Newark, N. J.			6.70 *W10*		7.60 *W10*						
	Camden, N. J.			6.70 *P10*								
	Bridgeport, Putnam, Conn.	4.80 *N8*		6.80 *W10*	5.725 *N8*			4.750 *N8*				
	Sparrows Pt., Md.		4.65 *B3*					4.50 *B3*		6.30 *B3*	6.725 *B3*	6.70 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Pa.	4.80 *M7*	4.80 *M7*	6.70 *W11* 6.45 *C14* 6.70 *B5*		7.725 *A5,B5*		4.50 *R3*				6.90 *A5* 6.90 *W6*
	Spring City, Pa.			6.35 *K4*		7.60 *K4*						
MIDDLE WEST	Alton, Ill.	4.85 *L1*										6.775 *L1*
	Ashland, Newport, Ky.							4.50 *A7,N5*		6.30 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.75 *R3*		6.25 *R2,R3*	5.575 *R3,T5*	7.425 *R2,R3, T5*		4.50 *E1*				
	Chicago, Joliet, Ill.	4.65 *U1, N4,W8,R3,* 5.15 *P13*	4.65 *N4,R3,* 5.15 *P13*	6.25 *B5,W8, W10,A5,L2*	5.575 *U1,R3, W8*	7.425 *A5,W8, W10,L2,B5*		4.50 *U1,W8, I3,R3* 4.725 *A1*	5.575 *U1*	6.30 *U1*	6.725 *U1*	6.60 *A5,R3, N4,W7*
	Cleveland, Ohio	4.65 *R3*	4.65 *R3*	6.25 *A5,C13*		7.425 *A5,C13*	6.80 *R3*	4.60 *J3,R3*	5.575 *J3*		6.725 *R3,J3*	6.60 *A5, C13*
	Detroit, Mich.	4.75 *G3*	4.75 *G3*	5.90 *R5* 6.45 *B5* 6.50 *P3* 6.10 *P8*	5.575 *R5* 5.675 *G3*	7.425 *R5* 7.625 *B5,P3, P8*	6.90 *G3*	4.60 *G3*			6.825 *G3*	
	Duluth, Minn.											6.60 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.65 *I3, U1, Y1*	4.65 *I3, U1, Y1*	6.25 *M5,R3*	5.575 *I3, U1, Y1*	7.425 *M5, R3*	6.80 *U1,I3, Y1*	4.50 *I3, U1, Y1*	5.575 *I3*	6.30 *U1, Y1*	6.725 *U1, I3, Y1*	6.35 *M4*
	Granite City, Ill.							4.70 *G2*				
	Kokomo, Ind.											6.70 *C9*
	Sterling, Ill.	4.75 *N4*	4.75 *N4*									6.70 *N4*
	Niles, Warren, Ohio Sharon, Pa.	4.65 *R3,C10*		6.25 *C10*	5.75 *C10*	7.425 *C10*	6.80 *R3*	4.50 *S1,R3*		6.30 *S1*	6.725 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.65 *J3, U1, C11*	4.65 *J3, U1*	6.25 *A5,C8, C11,J3, W10,B4,R3*	5.575 *U1,C11*	7.425 *A5,C11, W10,C8,R3*	6.80 *J3, U1*	4.50 *J3, U1*	5.575 *U1*	6.30 *U1*	6.725 *J3, U1*	6.60 *A5,J3, P6*
	Portsmouth, Ohio											6.60 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.65 *W3*						4.50 *W3,W5*				
	Youngstown, Ohio	4.65 *U1,Y1, C10,R3*	4.65 *U1,Y1, R3*	6.25 *Y1, U1*	5.575 *U1,Y1, C10*	7.425 *Y1,C10, F2*	6.80 *U1,Y1*	4.50 *U1,Y1, R3*		6.30 *Y1*	6.725 *Y1*	6.60 *Y1*
WEST	Emeryville, Cal.	5.40 *J5*	5.40 *J5*									
	Fontana, Cal.	5.35 *K1*	5.35 *K1*		6.625 *K1*		7.50 *K1*	5.20 *K1*		7.00 *K1*	7.375 *K1*	
	Geneva, Utah							4.50 *C7*			6.725 *C7*	
	Kansas City, Mo.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*					6.85 *S2*
	Los Angeles, Torrance, Cal.	5.35 *B2,C7*	5.35 *B2,C7*	7.70 *R3*	6.625 *B2*		7.50 *B2*				7.625 *B2*	7.55 *B2*
	Minnequa, Colo.	5.10 *C6*	5.10 *C6*					5.35 *C6*				6.85 *C6*
	Portland, Ore.	5.40 *O2*	5.40 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.35 *C7* 5.40 *B2,P9*	5.35 *C7* 5.40 *B2,P9*				7.55 *B2*					7.55 *C7* 7.55 *C6*
	Seattle, Wash.	5.40 *B2,P12, N6*	5.40 *B2,P12*				7.55 *B2*	5.40 *B2*		7.20 *B2*	7.625 *B2*	
SOUTH	Atlanta, Ga.	5.15 *A8*	5.15 *A8*									6.80 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.65 *T2,R3* 5.15 *C16*	4.65 *T2,R3* 5.15 *C16*				6.80 *T2*	4.50 *T2,R3*			6.725 *T2*	6.60 *R3,T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*	4.85 *L3* 4.60 *S2*		6.40 *S2*	6.825 *S2*	6.85 *S2*

Steel Prices *(Effective June 12, 1956)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Youngstown *R3*	18.50	1.25	21.50	5.25	24.00	8.75	26.50	10.00	27.00	11.00	27.50	11.50	29.00	11.75								
Fontana *K1*	6.00	13.25	9.00	+9.25	11.50	+5.75	14.00	+4.00	14.50	+3.00	15.00	+2.50	16.50	+1.75								
Pittsburgh *J3*	18.50	1.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	4.00	+11.	10.50	+6.25	13.00	+3.75	14.50	+2.25
Alton, Ill. *L1*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Sharon *M3*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Fairless *N2*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Pittsburgh *N1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	4.00	+11.	10.50	+6.25	13.00	+3.75	14.50	+2.25
Wheeling *W5*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Wheatland *W4*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Youngstown *Y1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	4.00	+11.	10.50	+6.25	13.00	+3.75	14.50	+2.25
Indiana Harbor *Y1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.00	26.00	11.50	26.50	12.00	28.00	11.75								
Lorain *N2*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	4.00	+11.	10.50	+6.25	13.00	+3.75	14.50	+2.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Youngstown *R3*	23.00	7.25	27.00	11.25	29.00	14.75	29.50	14.00	30.00	15.00	30.50	15.50	31.00	14.75								
Fairless *N2*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Fontana *K1*	10.50		14.50		16.50		17.00		17.50		18.00		18.50									
Pittsburgh *J3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	5.50	+8.50	13.00	+2.75	15.50	+0.25	20.50	4.75
Alton, Ill. *L1*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Sharon *M3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Pittsburgh *N1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	5.50	+8.50	13.00	+2.75	15.50	+0.25	20.50	4.75
Wheeling *W5*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Wheatland *W4*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Youngstown *Y1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	5.50	+8.50	13.00	+2.75	15.50	+0.25	20.50	4.75
Indiana Harbor *Y1*	22.00	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Lorain *N2*	21.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	5.50	+8.50	13.00	+2.75	15.50	+0.25	20.50	4.75

Threads ordy, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.60	T-1
18	4	1	—	5	2.305	T-4
18	4	2	—	—	1.765	T-2
1.5	4	1.5	8	—	.96	M-1
6	4	2	6	—	1.35	M-3
6	4	2	5	—	1.105	M-2

High-carbon chromium	.77 D-3, D-5
Oil hardened manganese	.42 O-2
Special carbon	.39 W-1
Extra carbon	.33 W-1
Regular carbon	.275 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b

	Cladding	Plate (*A3, J2, L4*) 10 pct	Plate (*A3, J2, L4*) 15 pct	Plate (*A3, J2, L4*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	304	30.30	33.15	36.05	32.50
	316	35.50	38.45	41.40	47.60
	321	32.00	34.85	37.75	37.25
	347	34.40	37.90	41.40	48.25
	405	25.80	29.60	33.35	.....
	410, 430	25.30	29.10	32.85	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 42.15; 1 side, 33.40.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	8.40	8.60	.....
Armature	9.35	9.60	10.10
Elect.	9.95	10.20	10.70
Motor	10.95	11.20	11.70
Dynamo	11.85	12.10	12.60
Trans. 72	12.80	13.05	13.55
Trans. 65	13.35	Grain Oriented	
Trans. 58	13.85	Trans. 80	17.45
Trans. 52	14.85	Trans. 73	17.95

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1956 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.10
Old range, bessemer	11.25
Old range, nonbessemer	11.10
Mesabi, bessemer	11.00
Mesabi, nonbessemer	10.85
High phosphorus	10.85

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9-15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	152	162	...	173	175	7.40	7.80
Aliquippa, Pa. *J3*	152	162	...	...	...	7.40	7.80
Atlanta *A8*	154	167	...	177	180	7.60	8.125
Bartonville *K2**	154	168	...	175	181	7.60	8.20
Buffalo *W6*	...	...	...	...	...	7.50	7.90
Chicago, Ill. *N4***	152	166	...	175	179	7.50	8.10
Cleveland *A6*	157	...	...	...	...	7.50	.....
Cleveland *A5*	...	...	...	...	...	7.40	.....
Crawfordsville *M4**	154	168	...	177	181	7.60	8.20
Donora, Pa. *A5*	152	162	...	175	175	7.50	7.90
Duluth *A5*	152	162	...	175	175	7.50	7.90
Fairfield, Ala. *T2*	152	162	...	175	175	7.50	7.90
Galveston *D4*	157	...	...	...	...	...	.....
Houston *S2*	157	170	...	...	180	7.65	8.05
Johnstown, Pa. *B3**	152	166	...	...	175	7.40	7.80
Joliet, Ill. *A5*	152	162	...	175	175	7.50	8.10
Kokomo, Ind. *C9*	154	154	...	177	177	7.60	8.00
Los Angeles *B2**	...	...	...	...	...	8.35	8.925
Kansas City *S2*	157	167	...	178	180	7.65	8.05
Minnequa *C6*	157	167	162	178	180	7.65	8.05
Monessen *P6*	152	162	...	...	...	7.40	7.80
Moline, Ill. *R3*	...	162	162	...	...	...	.....
Pittsburg, Cal. *C7*	171	185	...	199	195	8.45	8.85
Portsmouth *P7*	...	...	...	...	...	7.50	.....
Rankin, Pa. *A5*	152	162	...	...	175	7.40	7.90
So. Chicago *R3*	152	162	157	173	175	7.40	7.80
S. San Francisco *C6*	...	...	...	197	195	8.35	8.75
Sparrows Pt. *B3**	154	...	...	175	181	7.60	8.20
Struthers, O. *Y1*	...	...	...	...	...	7.50	8.00
Worcester *A5*	158	...	...	...	...	7.70	8.20
Williamsport, Pa. *S5*	...	...	160	...	...	...	.....

Galvanized products computed with zinc at 5¢ per lb
Exceptions: *zinc at 12.5¢ per lb; ** 13¢ zinc.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bristol, Conn. *W12*	...	...	10.90	13.05	15.75
Buffalo, N. Y. *R7*	7.00	8.95	10.50	12.65	15.35
Carnegie, Pa. *S9*	...	9.05	10.60	12.75	15.35
Cleveland *A5*	7.10	9.05	10.60	12.75	15.45
Detroit *D1*	7.20	9.15	10.70	12.85	.....
Detroit *D2*	7.20	9.15	10.70	...	.....
Harrison, N. J. *C11*	...	...	10.90	13.05	15.75
Indianapolis *C5*	7.15	9.10	10.50	12.65	15.35
New Castle, Pa. *B4*	7.00	8.95	10.50	12.65	.....
New Haven, Conn. *D1*	7.55	9.35	10.90	13.05	.....
Pawtucket, R. I. *N7*	7.65	9.35	10.90	13.05	15.75
Pittsburgh *S7*	7.10	9.05	10.60	12.75	15.45
Riverdale, Ill. *A1*	7.20	9.05	10.60	12.75	15.45
Sharon, Pa. *S1*	7.10	9.05	10.60	12.75	15.45
Trenton *R4*	...	...	...	...	.....
Wallingford *W1*	7.55	9.35	10.90	13.05	15.75
Warren, Ohio *T4*	7.00	8.95	10.50	12.65	15.35
Weirton, W. Va. *W3*	7.10	8.95	10.50	...	.....
Worcester, Mass. *A5*	7.65	9.35	10.90	13.05	15.75
Youngstown *C5*	7.00	8.95	10.50	12.65	15.35

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	32.09	37.37	29.93	.....
	2½	12	43.22	50.31	40.31	.....
	3	12	49.90	58.10	46.55	.....
	3½	11	58.26	67.83	54.34	.....
	4	10	77.36	90.07	72.17	.....
National Tube	2	13	32.09	37.37	29.93	.....
	2½	12	43.22	50.31	40.31	.....
	3	12	49.90	58.10	46.55	.....
	3½	11	58.26	67.83	54.34	.....
	4	10	77.36	90.07	72.17	.....
Pittsburgh Steel	2	13	32.09	37.37	.....	.....
	2½	12	43.22	50.31	.....	.....
	3	12	49.90	58.10	.....	.....
	3½	11	58.26	67.83	.....	.....
	4	10	77.36	90.07	.....	.....

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery ‡ Charge	Sheets Hot-Rolled	Sheets Cold-Rolled	Sheets Galvanized (10 gage)	Strip Hot-Rolled	Strip Cold-Rolled	Plates	Shapes Standard Structural	Bars Hot-Rolled	Bars Cold-Finished	Alloy Bars Hot-Rolled 4615 As rolled	Alloy Bars Hot-Rolled 4140 Annealed	Alloy Bars Cold-Drawn 4615 As rolled	Alloy Bars Cold-Drawn 4140 Annealed
Baltimore	$.10	7.31	8.32	8.37	7.65	.....	7.63	7.93	7.61	8.62	14.38	13.44–13.96	16.36	16.29–16.49
Birmingham	.15	6.80	7.93	8.85	7.06	.....	6.99	7.28	7.08	9.35	.....	.....	.....	.....
Boston	.10	8.22	9.17	10.42	8.31	.....	8.51	8.37	8.37	9.96	.....	13.76	.....	16.81
Buffalo	.15	7.35	8.40	10.16	7.50	.....	7.80	7.75	7.50	8.05	.....	13.65	.....	16.70
Chicago	.15	7.28	8.39	9.25	7.36	.....	7.60	7.58	7.42	7.90	.....	13.30	.....	16.30
Cincinnati	.15	7.40	8.38	9.10	7.60	.....	7.89	8.05	7.66	8.30	13.59	13.55	16.44	16.60
Cleveland	.15	7.28	8.39	9.10	7.46	.....	7.77	7.91	7.48	8.15	13.41	13.36	16.26	16.41
Denver	.....	8.60	10.76	11.22	8.90	.....	8.60	8.75	8.90	9.82	.....	.....	.....	17.97
Detroit	.15	7.47	8.58	9.53	7.49	.....	7.88	8.05	7.70	8.19	13.70	13.54	16.55	16.59
Houston	.....	7.85	8.75	10.49	8.15	.....	7.80	8.20	8.25	9.85–9.95	14.35	14.00	17.15	17.05
Kansas City	.20	7.47	8.76	9.17	7.73	.....	7.66	7.95	7.75	8.52	13.87	13.52	16.72	16.57
Los Angeles	.10	8.25	10.10	11.10	8.60	.....	8.85	8.40	8.25	11.00	.....	14.50	.....	18.10
Memphis	.10	7.12	8.25	.....	7.38	.....	7.31	7.60	7.40	9.15	.....	.....	.....	.....
Milwaukee	.15	7.37	8.48	9.34	7.45	.....	7.69	7.75	7.51	8.09	.....	13.29	.....	16.39
New Orleans	.15	7.20	8.35	.....	7.45	.....	7.40	7.70	7.50	9.55	.....	.....	.....	.....
New York	.10	7.88	8.98	9.73	8.33	.....	8.31	8.21	8.26	9.87	.....	13.67	.....	16.72
Norfolk	.20	7.25	.....	.....	7.65	.....	7.45	7.95	7.65	9.50	.....	.....	.....	.....
Philadelphia	.10	7.44	8.54	9.51	8.09	.....	7.82	7.85	7.83	8.62	.....	13.45	.....	16.50
Pittsburgh	.15	7.28	8.39	9.55	7.46	9.25	7.60	7.58	7.42	8.15	13.85	13.30	16.25	16.20
Portland	.....	7.80–8.60	8.85–10.15	10.65	8.00	7.95	7.75	7.85–8.15	7.95	12.20	.....	15.00	.....	17.50
Salt Lake City	.20	.....	10.60	.....	9.35	.....	.....	9.20	9.15	.....	.....	.....	.....	.....
San Francisco	.10	8.30	9.75	10.25	8.45	.....	8.40	8.35	8.25	11.55	.....	14.50	.....	18.80
Seattle	.80	8.75	10.50	10.90	8.90	.....	8.50	8.50	8.60	12.25	.....	14.75	.....	17.80
St. Louis	.15	7.57	8.68	9.54	7.65	.....	7.89	7.98	7.71	8.44	.....	13.49	.....	16.59
St. Paul	.25	7.94	8.59–9.14	9.89	7.72	.....	7.65	7.94	7.74	8.51	.....	13.51	.....	16.31

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
Exceptions. (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb. $.25 delivery.
*Plus analysis charge. ‡Deduct for country delivery.

(Effective June 12, 1956)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	4.725	5.65	5.825	....	....	....	....
So. Chicago *R3*	....	....	....	8.05	....	....	....
Ensley *T2*	4.725	5.65	....	....	....	....	....
Fairfield *T2*	....	5.65	....	8.05	....	5.625	....
Gary *U1*	4.725	5.65	....	....	....	5.625	....
Ind. Harbor *I3*	4.725	....	5.825	7.90	....	5.625	....
Ind. Harbor *Y1*	....	....	....	8.05	....	....	....
Johnstown *B3*	....	5.65	....	....	....	....	....
Joliet *U1*	....	....	5.825	....	....	....	....
Kansas City *S2*	....	....	....	7.90	....	....	....
Lackawanna *B3*	4.725	5.65	5.825	....	....	5.625	....
Lebanon *B3*	....	....	....	....	....	....	12.15
Minnequa *C6*	4.725	6.15	5.825	7.90	....	5.625	12.15
Pittsburgh *O1*	....	....	....	....	11.90	....	12.15
Pittsburgh *P5*	....	....	....	....	....	....	12.15
Pittsburgh *J3*	....	....	....	8.05	....	....	....
Seattle *B2*	....	....	....	8.40	....	5.775	12.65
Steelton *B3*	4.725	....	5.825	....	....	5.625	....
Struthers *Y1*	....	....	....	8.05	....	....	....
Torrance *C7*	....	....	....	....	....	5.775	....
Williamsport *S5*	....	5.65	....	....	....	....	....
Youngstown *R3*	....	....	....	8.05	....	....	....

COKE

Furnace, beehive (f.o.b. oven) Connellsville, Pa.	Net-Ton $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$17.00 to $18.00
Foundry, oven coke	
Buffalo, del'd	$28.75
Chicago, f.o.b.	27.00
Detroit, f.o.b.	27.50
New England, del'd	28.55
S aboard, N. J., f.o.b.	26.75
Philadelphia, f.o.b.	26.50
Swedeland, Pa., f.o.b.	26.50
Painesville, Ohio, f.o.b.	27.50
Erie, Pa., f.o.b.	27.50
Cleveland, del'd	29.43
Cincinnati, del'd	28.59
St. Paul, f.o.b.	26.50
St. Louis, f.o.b.	28.50
Birmingham, f.o.b.	25.65
Lone Star, Tex., f.o.b.	19.50

ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	23.00	40	100, 110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
12	72	23.50	20	90	10.10
10	60	24.25	17	72	10.35
7	60	24.50	14	72	10.85
5	60	27.25	12	60	11.75
4	40	30.25	10	60	11.80
3	40	32.00	8	60	12.10
2½	30	33.75			
2	24	52.50			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Cast elliptical, 18 in. or longer, 5000 lb lots	64.42
Electrodeposited	56.78
Brass, 80-20, ball anodes, 2000 lb or more	60.00
Zinc, ball anodes, 2000 lb lots (for elliptical add 2¢ per lb)	21.25
Nickel, 99 pct plus, rolled carbon (rolled depolarized add 3¢ per lb)	90.50
Cadmium	$1.70
Tin, ball anodes and elliptical	$1.06 to $1.10

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	83.50
Copper sulphate, 5 or more 100 lb bags, per cwt	21.15
Nickel salts, single, 4-100 lb bags	33.25
Nickel chloride, freight allowed, 300 lbs	43.50
Sodium cyanide, domestic, fob N. Y. 200 lb drums (Philadelphia price 21.80)	21.55
Zinc cyanide, 100 to 900 lb	55.55
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 1 to 20 100 lb drums	30.25

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolt

	Discounts Full case	Full case 20,000 lb. Quantity or more
½ in. & smaller x 6 in. & shorter	61	63
Larger than ½ in. diam. and all diam. longer than 6 in.	55	57
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	61	63
Lag, all diam. x 6 in. & shorter	61	63
Lag, all diam. longer than 6 in.	55	57
Plow bolts	61	63

Nuts, Hex, HP, reg. & hvy.

¾" or smaller	64	66
⅞" to 1⅛" inclusive	63	65
1¼" to 1½" inclusive	65	67
1⅝" and larger	61	63

C.P. Hex, regular & hvy.

¾" or smaller	64	66
⅞" and larger	61	63

Hot Galv. Nuts (all types)

1½" or smaller	44	47

Finished, Semi-finished, Hex Nuts

¾" and smaller	66	66
⅞" and larger	63	63

Add 25% for less than case or keg quantity.

Rivets

	Base per 100 *lb*
½ in. and larger	$9.95
	Pct Off List
7/16 in. and smaller	32

Cap Screws

	Discount *H.C. Heat*
Bright Treated	
New std. hex head, packaged ¼" thru ½" diam. x 6" and shorter	34 20
9/16" and ⅝" x 6" and smaller and shorter	31 16
¾", ⅞", 1" x 6" and shorter	9 +11
New std. hex head, bulk* ¼" thru ½" diam. x 6" and shorter	49 41
9/16" and ⅝" diam. x 6" and shorter	43 39
¾", ⅞", 1" x 6" and shorter	31 20

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

		Discount Mach. Screws	Stove Bolts
Packaged, package list		27	38
Bulk, bulk list	*Quantity*		
¼-in. diam. & under	25,000-200,000	20	61
5/16-in. diam. & larger	15,000-100,000	20	61
All diam. over 3 in. long	5,000-100,000	—	61

Machine Screw & Stove Bolt Nuts

		Discount Hex	Square
Packaged, package list		24	27
Bulk, bulk list	*Quantity*		
⅜-in. diam. & smaller	25,000-200,000	18	20

CAST IRON WATER PIPE INDEX

Birmingham	113.1
New York	125.6
Chicago	127.5
San Francisco-L. A.	134.8

Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$122.00
No. 1 Ohio	....
Sec. quality, Pa., Md., Ky., Mo., Ill.	114.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	18.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$128.00
Childs, Hays, Pa.	138.00
Chicago District	138.00
Western Utah	144.00
California	151.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O.	145.00
Curtner, Calif.	163.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	21.00
Silica cement, net ton, bulk, Hays, Pa.	24.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	22.00
Silica cement, net ton, bulk, Utah and Calif.	32.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$91.00
Standards chemically bonded, Curtner, Calif.	101.25
Burned, Balt.	85.00

Magnesite Brick

Standard Baltimore	$114.00
Chemically bonded, Baltimore	102.00

Grain Magnesite

St. ¾-in. grains

Domestic, f.o.b. Baltimore in bulk fines removed	$64.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	40.00
in sacks	46.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$15.00
Midwest	15.60
Missouri Valley	14.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	9.50¢
Canadian sponge iron, Del'd in East, carloads	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 00.8+% Fe	86.0¢ to $1.55
Aluminum freight allowed	38.00¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	59.50¢
Copper, reduced	59.50¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic 99.85% min. Fe .03 max. Del'd	$5.00
Lead	8.90¢ plus metal value
Manganese	70.0¢
Molybdenum, 99%	$3.00 to $3.25
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed, #80	$1.18
Silicon	43.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	99.0¢
Stainless steel, 316	$1.32
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$4.50
Zinc, 10 ton lots	18.75¢ to 32.50¢

Because it identifies *Hoeganaes Ancor-Flame*—sponge iron powder—which when fed into an oxyacetylene flame oxidizes rapidly and greatly increases flame

This label is the answer to tough metal removal problems—

temperature; allowing a flame-cut or scarfing of stainless steels and oxidation-resistant metals. There's an interesting story behind the product, behind this label. Ask for more details, you'll be interested in the result.

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Made to your blueprints in many metals, in weights from ¼ to 15 pounds, depending on design. Accurate, smooth, and flash free. Their dense fibrous structure and controlled grain flow gives tremendous strength. Machined if desired.

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In a great variety of metals and alloys. High strength parts accurately produced —no flash, no blowholes. Excellent machining qualities.

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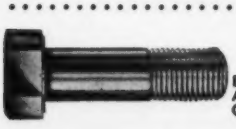

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Ferroalloy Prices

(Effective June 12, 1956)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk carloads, del'd, 67-71% Cr, .30-1.00% max. Si.

0.02% C	38.50	0.20% C	35.50
0.03% C	38.00	0.50% C	35.25
0.06% C	36.50	1.00% C	34.00
0.10% C	36.00	1.50% C	33.85
0.15% C	35.75	2.00% C	33.75

4.00-4.50% C, 67.70% Cr, 1-2% Si... 26.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 25.00
0.025% C (Simplex) 31.75
0.10% C, 50-53% Cr, 2% max Si.... 33.75
8.50% max. C, 50-55% Cr, 3-6% Si.. 22.50
8.50% C, 50-55% Cr, 3% max Si.... 22.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.27
0.50% max. C	1.27
9 to 11% C, 88-91% Cr, 0.75% Fe..	1.36

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (⅛" thick) delivered packed. 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	1.25
Ton lots	1.27
Less ton lots	1.29

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	41.35
Ton lots	46.15
Less ton lots	48.65

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Ca, 60-65% Si, 3.00 max. Fe.

Carloads	22.95
Ton lots	25.25
Less ton lots	26.75

Calcium-Maganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 52-59% Si.

Carloads	23.05
Ton lots	24.95
Less ton lots	25.95

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	19.65
Less ton lots	20.90

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%. Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	10.75
Johnstown, Pa.	10.75
Sheridan, Pa.	10.75
Philo, Ohio	10.75
S. Duquesne	10.75

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	13.00
Ton lots packed	15.20

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$92.00
19 to 21%	3% max.	94.00
21 to 23%	3% max.	96.50

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	31.5
Ton lots	33.5
250 to 1999 lb	35.5
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn... 22.85

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	34.00	36.55	37.75
0.07% max. C	31.95	34.50	35.70
0.10% max. C	31.20	33.75	34.95
0.15% max. C	30.45	33.00	34.20
0.30% max. C	28.95	31.50	32.70
0.50% max. C	28.45	31.00	32.20
0.75% max. C, 80.85% Mn, 5.0-7.0% Si	25.45	28.00	29.20

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carload bulk	12.00
Ton lots	13.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	13.55
Ton lots, packed	15.75

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe	22.75	21.45
98% Si, 1% Fe	23.25	21.95

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	7.15
Ton lots, packed	9.75

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	12.75	75% Si	15.40
65% Si	14.50	85% Si	17.10
	90% Si	18.50	

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.10
Crucible	3.20
High speed steel (Primos)	3.30

Alsifer, 20% Al, 40% Si, 40% Fe, Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.34

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Sb plus Ta..... $4.65

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.54

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $200.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, delivered..... $3.45

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.33
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.30

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	17.50¢
Ton lots, packed lump	19.50¢
Less ton lots	20.00¢

Vanadium oxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.33

Zirconium contract basis, per lb of alloy

35-40% f.o.b freight allowed, carloads, packed	26.25¢
12-15%, del'd lump, bulk-carloads	8.50¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B 3.14%, Si 40-45%, per lb contained 2.... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed
Ton lots per pound ..... 14.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots..... 1.20
F.o.b. Wash., Pa.; Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
D, del'd.

Ton lots	$1.48
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots..... $2.05

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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Some Soft Spots . . . The used machinery market in **New York** is showing a few soft spots in the summer heat, but dealers are not really complaining. Very broadly speaking, cutting tools are the weakest items, although even here there is good demand for late model lathes and millers.

While overall the market is somewhat weaker than a month or two ago, demand for some items is still very strong. Cranes are among the hottest movers now, with dealers' stocks virtually depleted. The booming construction rate shows up in heavy demand for all types of fabricating equipment —bending rolls, shears, brakes, and ironworkers.

Customers are generally prepared to pay well for needed equipment. As in other parts of the country, latest model used machines in good condition often carry a premium over new tools because of short delivery times for the used items. In other words, buyers want their machines now and are willing to pay to get them.

The Eagle Screams . . . Fly in the ointment, however, is the current hard money situation. One dealer who does a large credit business comments, "My people are willing to pay 5 pct, but squawk loudly at 6 pct." This same dealer is sure that cheaper money would give a healthy boost to his sales this summer.

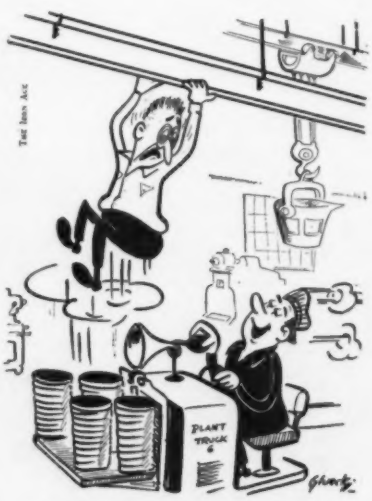
Export business continues to hold up, but it's nothing to shout about at present. There is some feeling that cheaper money would help here too, but exports have not fallen enough to start any real agitation. Business just hasn't picked up as much as hoped.

Biggest depressants to business here are the slumps in automotive and farm equipment. A lot of expected subcontracting work from these industries has failed to materialize, and metalworkers are holding back on equipment purchases until their order volume picks up.

Caution Light On . . . In addition to their direct effects the automotive and farm equipment soft spots have engendered or at least heightened a very real "go slow" psychology. This is not fear or panic, but rather a general wariness or wait-and-see attitude. No major expansions have been cancelled, but there is a general tendency to postpone the decision about that extra shaper until fall or until "the picture has clarified a bit."

More Good Than Bad . . . This wariness is an important but unmeasurable factor in the current softening in used machinery in the East.

But machinery dealers are not panicking, refuse to cry wolf. Business is still good, despite soft spots, and current order backlogs of new tool builders alone justify long-range optimism. And a lot of those postponed decisions are sure to be favorable when they are finally made.



"Has a nice tone, huh, George?"

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#500 Wallace Hydr. Bender 180°, Cap'y 2¼"
BENDING ROLLS
6' x 3/16" Niagara, Initial Type
10' x 10 Ga. Bertsch, Initial Type
12' x ¾" Cleveland Pyramid Type
16' x ⅝" Niles Pyramid Type
27' x 1" Southwark Pyramid Type

BRAKES—LEAF TYPE
10' x 10 Ga. Dreis & Krump No. 204
10' x 16 Ga. Dreis & Krump Hand Operated
12' x ⅜" Dreis & Krump
12' x ½" Dreis & Krump, Motor Driven

BRAKE—PRESS TYPE
12' x 3/16" Cincinnati

BULLDOZERS
#5 Williams & White, 20" Stroke, 11⅛" x 63" Face of Crosshead
#27 Williams & White, 32" Stroke 16" x 80" Face of Crosshead

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H	29' Span	230 Volt D.C.
5 ton Shepard Niles	48' Span	250 Volt D.C.
5 ton Shepard Niles	55' Span	220 Volt D.C.
5 ton P&H	80' Span	220/3/60 A.C.
5 ton P&H	80' Span	500/3/60 A.C.
5 ton Cleveland	96' Span	230 Volt D.C.
10 ton Cyclops	40' Span	220/440 A.C.
10 ton P&H	77' Span	230 Volt D.C.
10 ton Milwaukee	89' Span	230 Volt D.C.
10 ton Shepard Niles	87' Span	250 Volt D.C.
10 ton P&H	96' Span	Volt D.C.
15 ton Chesapeake	87' Span	250 Volt D.C.
25 ton Niles	87' Span	250 Volt D.C.
50 ton Hand Oper.	100' Span	
120 ton Whiting	80' Span	220/3/60 A.C.

CUT OFF MACHINES
Yoder AD-2 Cut-off, Max. Capacity ¾" O.D.
Yoder Type L Flying Cut-Off, Cap'y ⅝" to 3" Tubing
FORGING MACHINE
1" to 5" Acme, Ajax, National
HAMMERS BOARD DROP—STEAM DROP
STEAM FORGING—600 lb. to 20,000 lb.
LEVELLERS—ROLLER
60" United 17 Rolls 3¾" Dia.
72" McKay 17 Rolls 4½" Dia.
84" McKay Type E, 17 Rolls 5¼" Dia.
MULTI SLIDE MACHINE
No. 35 U. S. Multi Slide Machine with Edgewise Stock Straightener
PLANER—OPEN SIDE
48" x 48" x 12' Cincinnati, Three Head
PRESSES—HYDRAULIC
550 ton Baldwin Southwark 12" stroke 48" x 25" Between Columns
1257 ton Baldwin Southwark Forging Press, 30" Stroke Main Ram, 54" x 41" Bet. Columns
4500 ton B-L-H Hydr. Forging Press
PRESS—STRAIGHT SIDE
Clearing Model TF41500-200 Tripple Acting Strokes 40, 32, 14", Bed Area 100" x 200"
PUNCH & SHEAR COMBINATIONS
Style EF Cleveland 36" Throat, Punch 1¼" thru 1" Style W Cleveland 60" Throat, 312 Ton
#1½ Buffalo, Notcher, Punch 1-1/16" x ⅝", Shear Angles 4 x 4 x 9/16", etc.
Pels LUSEFF, Punch 1⅝" x 1", Shear Angles 6 x 6 x ⅞", Rd. 2½", Sq. 2⅜", etc.
ROLLING MILLS
10" x 16" Single Stand, Two High
12" x 16" Phila. Single Stand, Two High
12" x 20" Standard Single Stand, Two High
15" x 28" Farrel Single Stand, Two High
15" x 30" G & M Single Stand, Two High
16" x 24" Farrel Two Stand, Two High
22" x 12" x 40" Lewis 3-High Sheet Mill
12" Three High Bar Mill
26" x 54" United Single Stand, Two High
8" Torrington Ring Type Reversing Mill
For cold reducing 7" wide strip
ROLLS FORMING
8 Stand Maplewood, Spindle 2" Dia., 12" Dist. between spindles
SHEAR—BAR
Pels Type 18-23, Capacity 2" Rd., 1⅝" Sq.
SHEAR—BILLET
No. 7 Hilles & Jones, Motor Drive, Cap. 5" Sq.
SHEARS—GATE
80" x ¾" Pels
86" x 1" Hilles & Jones
SHEAR—ANGLE
6 x 6 x ⅝" Cleveland
SHEARS—SQUARING
12' x ⅜" Niagara, NEW 1951
12' x ⅜" Steelweld
SLITTERS
36" Yoder Slitting Line
G-48 Yoder Gang Slitter, 5" Threaded Arbor
STRAIGHTENERS
Kane & Roach 2 Roll Rotary Straightener, M.D. Capacity Millsteel ¼" to ⅝"
Kane & Roach 5 Roll #5250-B, Capacity ⅜" to 2½" solid, 4¼" Tube
Aetna Standard 12 Roll Straightener. Capacity 2"
SWAGING MACHINE
#6½A Fenn, Capacity 2¼" Tube, 3⅜" Solid 10" Die Length, Hydraulic Feed. LATE
TESTING MACHINES
60,000, 100,000, 200,000 Olsen & Riehle Universal 50,000 and 300,000 lb. Compression

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ELECTRIC POWER EQUIPMENT
A. C. MOTORS
3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1500	G.E.	MT	6900	1187
1	1100	G.E.	IM	2300	720
1	1000	A.C.	Mill	2300	240
1	800	G.E.	MT	2300	293
1	750	G.E.	MT-573	2200	1190
1	700	A.C.		2300	500
1	500	Whse.	CW	550	350
1	400	Whse.	CW-960A	440	1170
1	400	Whse.	CW	440	514
1	400	Whse.	CW-1213	2200	435
1	350	G.E.	IM-17A	440/2200	720
1	250	G.E.	MT-424Y	4000	257
1	250	G.E.	MT-559S	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	20QB	440	505
1	200	G.E.	IM	440	435
1	200	G.E.	IM	2200	580
1	150 (unused)	Whse.	CW	2300	435
2	125	A.C.		440	865
1	125	Al. Ch.		440	720
1	100	G.E.	IM-16	2200	435
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	695

SQUIRREL CAGE

1	800	G.E.	KT-573	2200	1180
2	650	G.E.	FT-559BY	440	3570
2	450	Whse.	CS-1420	2300/4150	354
1	400	G.E.	IE-15B	2200	1165
1	400	G.E.	IK	2200	500
1	200	G.E.	IK-17	440	580
3	200	G.E.	KT-557	440	1800
1	150/75	G.E.	IK	440/900/450	
1	150	Whse.	CS-856S	440	880
1	150	Whse.	CS	440	580
2	125	Al. Ch.	ARW	2200	1750

SYNCHRONOUS

Qu.	H.P.	Make	Type	Volts	RPM
1	7000	G.E.	ATI	2300/6600	600
1	4350	C.W.	35018L	4000/6900/13800	514
1	2850	Whse.	.8 p.f.	2300/4600	514
1	2800	Whse.	.8 p.f.	2300	720
2	2000	Whse.		2300	120
2	1750	G.E.	ATI	2300	3600
1	735	G.E.	ATI	2200/12000	600
2	500	G.E.	TS-7587	2200	1200
1	450	Whse.		2200	128.5
1	450	Whse.		2200	450
1	400	G.E.	TS-7565	2200	1200
1	325	G.E.	ATI	440	1800
1	225	G.E.	ATI	440	1800

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Pels FV-75 Bar & Billet Shear, Cap. 7⅛" rd

10' x ½" Plate Shear, Long & Allstatter 10" throat, M.D. Rebuilt

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Williams White Bulldozers, #22, #3, #4, #25, #6, #29 U-type

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Single and Double End Punches

Multiple Punches

No. 3 Motch & Merryweather Saw, with Saw Grinder

BOLT, NUT AND RIVET MACHINERY, COLD HEADERS, THREAD ROLLERS, THREADING MACHINES, TAPPERS, COLD BOLT TRIMMERS, SLOTTERS, HOT HEADERS AND TRIMMERS, COLD AND HOT PUNCH NUT MACHINES.

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MOTOR GENERATOR SETS

Qu.	KW	Make	R.P.M.	D.C. Volts	A.C. Volts
1	2500	Whse.	720	600	4160/2300
1	2000	Al. Ch.	720	250	4160/2300
1	1200	Whse.	720	600	2300
1	1120	Elliott	720	260/280	2300
1	500	G.E.	1200	250	2300/440
1	500	Ch. Wh.	720	575/600	2300/440
1	300	G.E.	1200	250/275	2300
1	200	Elliott	1200	125	4000/2200
1	150	G.E.	1200	250	2300/440
1	120	Whse.	1200	250	2300/440
1	100	Al. Ch.	1200	250	4000/2200

DIRECT CURRENT MOTORS

Qu.	H.P.	Make	Type	Volts	R.P.M.
2	3000	Whse.	Mill	525	600
6	1500	Whse.	Mill	525	600
4	700	Whse.	Mill	250	300/700
2	600	Al. Ch.	Mill	600	300/600
2	600	Whse.	Mill	230	110/220
2	500	Whse.	Mill	250	285/710
1	450	Whse.	SK	230	450/600
1	350	G.E.	CD-109	230	1150
1	300	Whse.	Mill	230	300
4	275	Whse.	qM	230	425/850
1	200/250	El. Dy.	Fwd. Brg.	230	400/1300
1	200	Whse.	SK-210	230	400/800
1	180	G.E.	MPC	230	400
1	150	Whse.	SK-301	230	300/900
2	125	Whse.	SK-184	230	575/850
1	125	G.E.	MPC	230	400/600
1	100	El. Dy.	30-B	230	450/1350
3	100	El. Dy.	30-S	230	475/950
1	80	Reliance	651-T	230	575/1150
1	60/80	El. Dy.	358	230	525/1150
1	40	G.E.	CD-123	230	850/1000
1	40	Whse.	SK-140	230	500/1700
1	32½	Whse.	SK-150	230	400/1200
2	25	Whse.	SK-93	230	1800
1	20	Cr. Wh.	D.P.B.B.	230	1150/2400
1	20	Whse.	SK-123	230	400/1200
2	15	G.E.	CD-85	230	575/2300
2	15	Whse.	SK-100L	230	500/1500
1	15	Reliance	155-T	230	400/1600
1	10	Whse.	SK-103	230	400/1600
1	10	Al. Ch.	E-122	230	300/1200
8	10	Whse.	SK-91	230	250/1000
1	7½	G.E.	CD-75	230	690/2070
1	7½	G.E.	CD-85	230	450/1350
4	5/7½	Reliance	T.E.F.C.	230	337/1350

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48" CLEVELAND COMBINATION ROLLER LEVELLER & CUT TO LENGTH SHEAR, 48" x 1/16" Capacity, up to 120" Long Sheets.

50 TON OVERHEAD ELECTRIC TRAVELLING CRANE, 100' Span, 230 Volts DC, with 2-25 Ton Trolleys and 5 Ton Aux. Hoist. Very Low Price.

10 TON ALLIANCE ELECTRIC TRAVELLING CRANE, 43' 10" Span, 230 Volts DC, Cab equipped with West. K Motors. We have four identical Cranes.

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200 HP G.E. SYNC. MOTOR, 900 RPM 2300 Volts.
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No. 72A5 Heald hyd. pl. internal, extended bridge, 1943.
No. 74 Heald hyd. pl. internal, X-sliding H.S., 1941.
No. 72A3 Heald hyd. pl. internal, X-sliding H.S. 1941.
12" x 24" Cincinnati ER hyd. universal cyl., 2U3B1H-5.
14" x 36" Landis type C hyd. pl. cylindrical, 1942.
6" x 30' Cincinnati EA Filmatic pl. cylindrical, 1942.

HAMMERS
No. 6-I Nazel, pneumatic, late.
No. 5N Nazel, self-contained.
No. 6B Nazel, self-contained.

LATHES
No. 3 Gisholt Univ. Turret Lathes (2), 1942.
24" x 8' LeBlond H. D. engine lathe.
14" x 6' Hendey Toolroom, 1940.
15" x 30" Lipe Carbo-Matic, 1942.
126" x 96' CC Niles Bement Pond engine lathe, 60 HP M.D.
90" swing Betts Bridgeford H. D. engine lathe, late.

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36" Rockford Hyd. Openside Shaper-Planer.
42" x 42" x 12' Liberty dbl. housing planer, 35 HP M.D.
48" x 48" x 10' Gray Maxi-Service.

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90 ton No. 92½C Toledo D.C. Str. Side.
260 ton No. 79½-72 Toledo D.C. Toggle drawing.
500 ton No. 1039 Hamilton D. C. adj. bed, 60" x 102".
2000 ton No. 6 National Maxidress Forging Press.

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24" Gould & Eberhardt Universal.
32" G & E Invincible, F.M.D., late type.
36" Rockford openside hyd. shaper-planer, ser. 39HU35.
36" Rockford hyd. vertical slotter, new 1944.

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3½" Ajax suspended slides, steel frame.
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Bliss-Toledo No. 93½H, cap. 140 tons, Bed 84" x 48".
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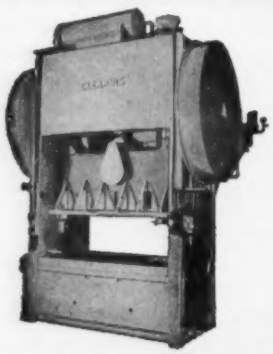

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4—Shaw Box Cranes, 230 volt DC, floor operated, 33' span, 20' lift, 3 motor.

1—O.E.T. Crane, 30 ton, Cab operated, 3 motor, 86'6" span, 230 volt, DC, lattice type girders, single hook on trolley, G.E. motors, E.C. & M. Co. controls. NEW CONDITION. Magnet control included.

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ELECTRIC ARC FURNACE
With Transformers, Switchgear, Controls, Etc.
11'6" Shell Diam. Melting Rate 6 Ton Per Hour
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2—500 KW General Electric Synchronous Motor Generator Sets

Generators; type MPC, 240 Volts D.C. 900 RPM, 40 degree

Synchronous Motors: 725 HP, 830 KVA, 3 PH 60 Cycle 2200 Volts. Equipment: D.C. Panels and C R 7069Y1

Synchronous Motor Panels

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HP	Make	Type	Speed
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1200	*Al. Ch.	ABW	1200
750	*Westg.	CS	900
500	*Al. Ch.	ARW	3600
500	*G.E.	KT569S	900
500	G.E.	KT-424	450
450	*Al. Ch.	ARW	1800
400	G.E.	KT-424	360
300	*G.E.	K-6344Y	1200
300	G.E.	K-6353TEFC	720
250	Westg.	CS-TEFC	1800
250	G.E.	KT-559	1800
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Effects of a strike of 250 members of the Brotherhood of Locomotive Firemen and Enginemen at the Tennessee Coal & Iron Div. of U. S. Steel have spread throughout the South's steel consumers. No progress toward settlement was reported despite negotiations last week.

Layoffs and Production Cutbacks Spread

More layoffs and shortened work weeks in fabricating plants in Birmingham and throughout the state are reported. Some plants have ceased operations for lack of steel. The 25,000 steelworkers have been idled since April 28 when the trainmen went out on strike and steelworkers refused to cross picket lines. An estimated 50,000 are idled.

Lowdown On Steel Labor Talks

Steel labor negotiators are miles apart in their views on what constitutes a fair settlement of union demands. But both sides are straining to avoid a blowup. Steel firms don't want to upset the business applecart, and Dave McDonald figures this is the year to prove his labor statesmanship. Administration is keeping hands off, barring an emergency situation.

Defense Plant Buying Extended

President Eisenhower is expected to sign a bill authorizing Defense Dept. to buy for another year industrial plants, machinery, or machine tools necessary to support defense mobilization.

American Can To Process Tinplate

American Can Co. will process 75 to 85 pct of its own tinplate in a new plant slated for Chicago area. Company will buy coils unplated and untreated, will do own treating, tinplating, and shearing. American also is going forward with tinless cans and continuous enameling of strip.

Combine to Produce Titanium Sponge

Republic Steel Corp. and Crane Co. have become equal partners in Cramet, Inc., a producer of titanium sponge. The company, formed by Crane in 1953, has a plant at Chattanooga, Tenn., with a capacity of 6000 tons of titanium sponge annually.

Wheeling Plans Benwood Improvements

Wheeling Steel Corp. will spend $3.5 million to improve and modernize the company's Benwood, W. Va., works. Major portion of the money will be spent on pipe finishing and warehousing facilities.

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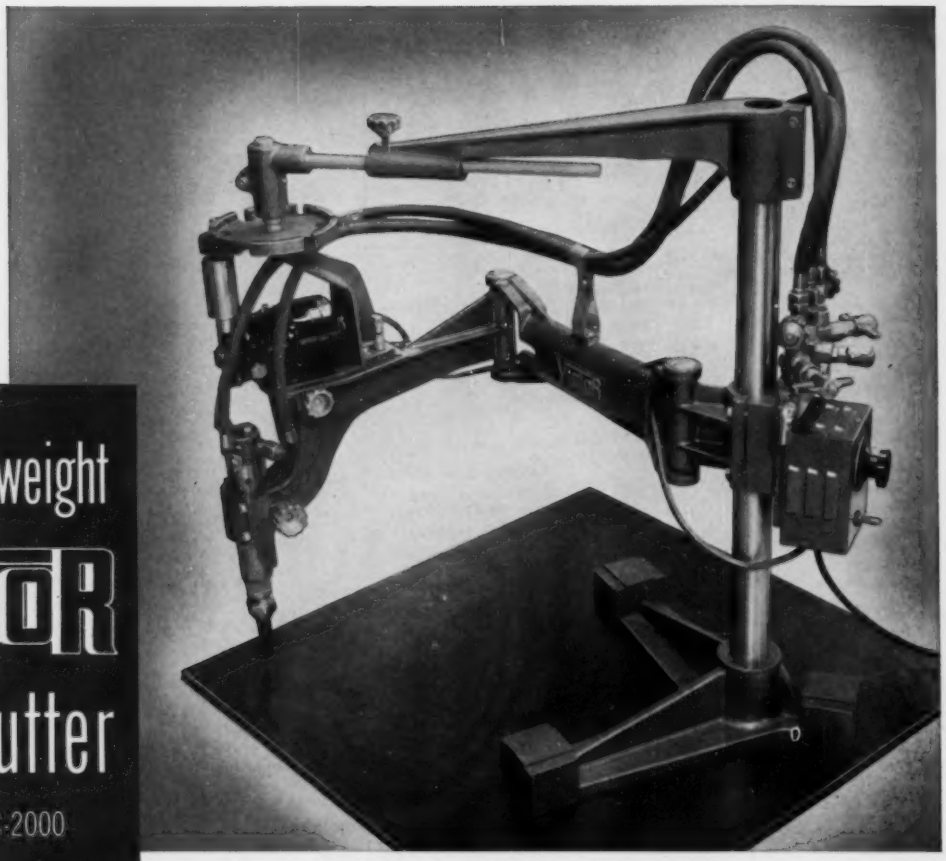

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